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The Physiotherapy Review

Medical Lib.

Vol. IX No. 3

Medical Lib.

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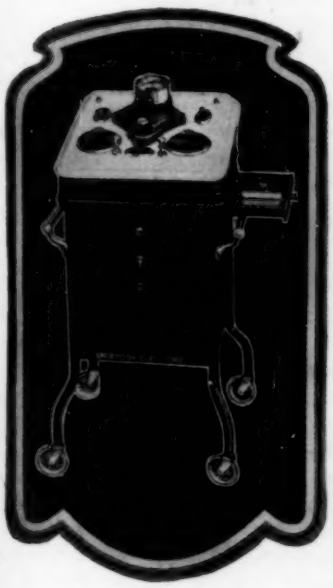

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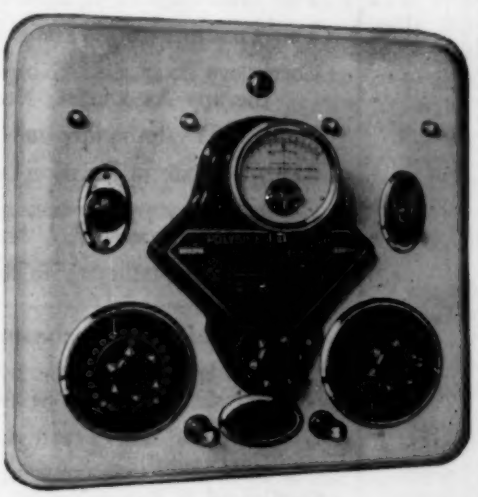

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The Treatment of Spastic Paralyses

John Jenks Thomas, A.M., M.D.

The subject of the treatment of spastic paralyses by physiotherapeutic methods is a wide one, and cannot be fully covered in a short talk, and all I can hope to do for a group of trained people in this field is to call your attention to some points in regard to these methods of treatment that seem important to me as a physician.

To review briefly, spastic paralyses may be caused by a great variety of troubles, since they are produced by the destruction or impairment of the cerebral motor neurones anywhere in their course in the brain or spinal cord, and they are contrasted with peripheral, or flaccid paralyses, which are produced by lesions of the peripheral motor neurones, either outside of the spinal cord or at the cell of the neurone in the ventral horn of the cord. The classical example of the latter type of paralysis is the well-known infantile paralysis, or poliomyelitis. The spastic paralyses are marked by certain characteristics, of which the chief are that there is no atrophy, or only moderate wasting from disuse, that the muscles are seldom left with no power of voluntary motion, though there is always some weakness even when the muscles seem to have a surprising amount of strength, as they quite often do, and in addition, the affected limbs show a constant though varying involuntary contraction which causes resistance to passive motion in all directions, which constitutes the spasticity, as the muscles are in a state of spasm. Along with this, and because of the increase of the muscle tonus, we find, as well, marked increase of the tendon reflexes, and in the lower limbs very often the extensor response of the great toe, instead of the normal flexor response, in testing for the plantar reflex. The distribution of the paralysis varies with the seat of the lesion. Generally it affects one side of the body only, as one hemisphere of the cerebrum only is affected as a rule. When the lesion is in the spinal cord both sides are apt to be affected, and at times this is so in lesions in the brain. This may be seen for example in brain tumors if they are so situated as to affect both hemispheres, but it occurs most frequently in children, as in hydrocephalus, which generally affects both sides of the brain, and also in a good many birth injuries, where the areas for the leg muscles which lie at the vertex of the brain extend onto the mesial surfaces of the hemispheres, where both areas are easily damaged by hemorrhages which extend along the falx, the part of the dura which lies between the two hemispheres.

These symptoms which have been mentioned are not, of course, the only ones found in cerebral lesions, but those which are seen when the cerebral motor tracts are damaged. Damage in other parts of the brain produce many other symptoms, some of which are not infrequently seen in cerebral paralyses when the lesion is extensive, and involves structures lying near the motor tracts. The most important of these from the point of view of treatment of the disability caused by the paralysis are the disturbances of coordination, different forms of which we designate by various names, as ataxic movements, choreiform movements, athetoid movements, and the strange alternations of spasm and relaxation of the muscles, both when at rest, and on attempted movement, such as are seen in the symptom complexes to which we give the name of dystonias. In these cases we may find no spasticity of the muscles, or varying amounts of it. Quite different from spasticity of the muscles is another syndrome in which we find rigidity of the muscles. This is seen in cases of paralysis agitans, and the very similar syndrome which not infrequently follows epidemic encephalitis, the so-called sleeping sickness. There we usually find tremors of the limbs also, but occasionally these cases show no tremor, constituting the cases which have been called paralysis agitans, sine agitatione, trembling paralysis without trembling. In this syndrome we see a true rigidity of muscles which resembles spasticity, but differs from it in certain important ways. It is true that the muscle tonus seems increased, and there is inability to relax completely, but the chief difference is in the presence of a marked slowing of the rapidity, both of muscular contraction and of muscular relaxation, with little or no real weakness, but which causes marked disturbances in the use of the muscles, affecting first the finer movements, as those of the fingers, and finally all movements. This symptom of rigidity and slowness of muscle action we have learned is caused by lesions outside of the motor tract, and are designated as the extrapyramidal motor lesions, in order to emphasize this fact. These fibres, certainly in their course in the brain, are separate from those of the true cerebral motor tract, or pyramidal tract, and the part of the brain where the damage is most frequently found, and where the cells of these fibres probably lie, is the substantia nigra, somewhat below the large basal ganglia of the brain, though some of the cells may lie in a part of that large group of nerve cells at the base of the brain, which we call the lenticular nucleus. Many of the physiotherapeutic measures which are of advantage in cerebral paralyses help these conditions, but the results obtained are generally very disappointing, because of a circumstance for which at present we have no remedy. This is that these cases are caused by processes which are for the most part progressive, so that what relief is obtained is in general only temporary, disappearing as the trouble becomes more advanced. Fortunately in most of the troubles which cause cerebral paralyses we have to do with processes which are acute and destructive, but not progressive, as in most of the forms of encephalitis, such as those arising in the course of various of the acute infectious diseases of children, and infections of the upper respiratory tract, and in the vascular lesions, where hemorrhages from the vessels destroy the cerebral structures more or less widely, and the resulting damage ceases, and comes to an end, with symptoms due to the destruction produced. Occasionally symptoms are seen which are probably due to irritation of the cerebral structures, perhaps from the scar tissue left from the destruction, or occasionally from pressure, as when large cerebral defects leave cavities containing cerebrospinal fluid, which may increase in volume, and so produce pressure signs.

In speaking of the treatment of spastic paralysis it is important to mention one condition which is very frequently seen in these cases, which is considered a secondary condition. I refer to the contractures which frequently appear in the affected limbs. These are never seen immediately after the onset of the paralysis, though in cases where there is extreme spasticity of the muscles

this may be mistaken for contractures, but we should distinctly differentiate between the two conditions. In spasticity we have a more or less constant but involuntary contraction of muscles which disappears when the patient is anesthetized, and generally also during sleep, while contractures appear gradually as muscles which are paralyzed actually shorten, so that the full amount of passive motion can no longer be obtained, even under favorable conditions such as have been mentioned. These contractures differ in one important respect from those which we see so often in cases of poliomyelitis. In poliomyelitis the contractures appear in the stronger muscles which are the opponents of the severely affected muscles, while in the cerebral paralyses they come on in the muscles in which the spasm is greatest, and in the muscles most affected by the paralysis. In the treatment by physiotherapeutic measures these contractures are of the greatest importance as they not only prevent active movements, but frequently distort the extremity in a way that interferes with its use, as in the common contracture of the tendo Achilles, which prevents the patient from getting the heel to the ground, and so increases the difficulty of walking. An important part of the treatment of these cases in the early stages consists in the use of measures to prevent the formation of these contractures, by stretching the spastic muscles, and if this is done daily and from the first, in the milder cases, we may entirely prevent the appearance of contractures, and occasionally if not severe they may be overcome by this method. Where this intermittent stretching of the muscles is not sufficient to prevent contractures they may be overcome by continuous stretching, as by the application of a plaster of Paris bandage to hold the foot in a position to stretch the tendon and muscle. When this bandage is removed it is always necessary to follow this treatment by prolonged and regular treatment by exercises and passive stretching to prevent the return of the contracture, and in cases where the limbs can be used fairly well, this may relieve the condition. In a good many cases, however, where the spasticity is marked, these measures do not suffice, and the contractures then may return after a time, and in such cases we have to resort to other measures. These may be surgical, and vary somewhat with the situation of the contractures, and their degree, and the amount of the muscular spasm present. Usually a tenotomy, or simple lengthening of the tendon of the contractured muscles is sufficient, but at other times where there is a good deal of muscular spasm, a myotomy gives more permanent relief. After any operation it is essential in the treatment that the tendency of the contractures to recur should be combated by the regular use of passive movements, stretching of the tendons, and active exercises.

With these contractures occurring in spastic paralyses the attempt to relieve the disabilities, and overcome the shortening of the muscles by various forms of apparatus, such as braces for the legs, or any apparatus except one devised simply for stretching certain muscles, such as a cock-up splint for the wrist, are generally of little avail, the results if anything being slight, and the benefit is almost always lost after a short time. This does not apply, however, to splints designed to hold the limb in a corrected position after an operation, though it must always be remembered that these should be removed daily for movements and exercises, beginning as soon as possible after the operation, and as soon as active use of the limbs can be obtained, the use of such apparatus should be restricted to the night time.

In general, I may say that in my experience the use of braces in spastic paralyses is almost invariably of very little advantage, and most often is a real disadvantage, often from their weight, but most often through lessening the voluntary use of the muscles, and so delaying the development of their voluntary use. In children particularly we see the disadvantage of the weight of the apparatus, the weak muscles being unable to perform movements otherwise possible, because of this.

In many of the cases of which we are speaking, however, the difficulty in the use of the affected limbs is not due to contractures, actual shortening of muscles or tendons, but to active spasm of muscles, coming either on attempts to use the muscles, or increased when such attempts are made. When this muscular spasm is either very marked or widespread it is most disabling, and many methods of overcoming it have been used, with varying effect. Among the most useful of these are various surgical measures. In many cases, tenotomies or myotomies of the muscles most affected are sufficient to overcome the spasticity to such a large extent that muscle training by voluntary exercises can be carried out. Occasionally to these procedures for lengthening the spastic muscles we may need to use the transplantation of tendons or muscles, as for instance, in the arm where attempts to use the hand bring a marked pronation of the forearm, or the spasm rotates the humerus inward so that the hand is put behind the back.

Another useful method of lessening spasticity when it is marked is the operation suggested by Foerster of section of the dorsal sensory nerve roots near the spinal cord. Foerster observed the fact that in cases where there is marked impairment of the muscle tonus, or hypotonia, there is generally found loss of some or various forms of sensation, particularly that of muscle sense, so he attempted to lessen muscle tonus by section of the dorsal nerve roots before their union with the ventral or motor roots, that is within the spinal canal. In order to avoid the ataxia which comes with marked impairment of the muscle sense, one divides only a part of the sensory roots of the limb affected in this operation, leaving half, or one third of them intact. This operation gives well-marked lessening of the muscular spasm, but has certain disadvantages. These are that the operation requires opening of the spinal canal by laminectomy, an operation of considerable difficulty, and considerable shock, as in all operations where there is extensive cutting of nerve structures. In addition, as the nerve roots for the arm and leg are situated one in the cervical region and the other in the lower thoracic region, cases in which an arm and a leg are both severely affected require that the operation should be repeated, as it is unwise to attempt to operate in both of these regions at one time.

Shortly after the conclusion of the war great interest was aroused by a new theory of muscle tonus, and a new operation for the relief of spasticity was worked out by two brilliant Australians, Drs. Hunter and Royle. Very briefly I may sum up my conclusions in regard to the scope of this operation, by saying that the matter still lacks confirmation. The theory consisted in thinking that muscle tonus was maintained chiefly by fibres from the great sympathetic system, and the operation consisted in cutting these fibres near the spine as they passed by the gray rami communicantes to the peripheral nerves. As to my own opinion in regard to this procedure, I only wish to say that some of the most able physiologists and neurologists have been unable to substantiate this theory, and that the general opinion of the surgeons and neurologists, who have observed cases after this operation, in which I concur, is that these cases in which the operation has been done show very doubtful lessening of the muscle spasm, and the tendency I think is to drop the use of this operation, except by a few

surgeons, loth as clinicians are to give up any method of treatment which offers any prospect of relieving a symptom which is so common, and so disabling, as the severer forms of spasticity are.

Experience has taught us that in most cases of cerebral paralysis more can be accomplished by physiological methods, such as are ordinarily meant when we speak of physiotherapy, than by any other forms of treatment, particularly after one has corrected any contractures if they are present. There is one exception to this, however, of which I must speak, and that is of the use of various forms of electrical currents to produce contractions in the muscles. Both the galvanic or constant current, and all the various modifications of the interrupted current, such as the Bristol coil, and the sinusoidal current, produce muscle contraction by stimulating the muscle fibres directly, or by stimulating the peripheral motor nerve or its ending, either at its termination in the muscle, or along the course of the fibre. As this neurone is not affected in cerebral paralyses, whether the locus of injury is situated in the cortex or along the course of these neurones in the brain, medulla or cord, theoretically we could not expect methods which stimulate an undamaged neurone, to have much effect upon other neurones, and clinical experience amply and fully confirms this opinion. Then, too, the various forms of the application of heat, whether by electricity, or various forms of light, including the ultra-violet ray, and the infra-red ray, and diathermy are of very little practical benefit in these cases, as their effect is practically confined to the muscles. In all cerebral paralyses the muscle suffers very little, the effect of the nervous lesion being confined almost entirely to the inhibition of growth, if the onset of the paralysis occurs before this is completed, as in infancy and childhood, and in addition to this to an impairment of the muscle nutrition, which is in most cases very moderate, with certain rare exceptions, the cause of which is not fully understood, and is probably from disuse. On the other hand very distinct improvement can be obtained in all but the most severe cases by the intelligent and persistent use of massage, and voluntary exercises.

Perhaps the chief effect of the massage procedures is that produced upon the muscles. Then in the cerebral paralyses of children, by improving the circulation of the limbs, we can prevent to a considerable extent the lagging behind in growth of the affected limbs, both in respect to the bulk of the muscles and also of the length of the limbs. In addition by the skillful use of massage, as well as by passive motion, we can lessen the muscular spasm, and in some cases prevent the formation of contractures, a matter of which I have already spoken. One thing, however, must constantly be borne in mind in these cases. That is we must remember that all forms of massage in addition to the effects upon the muscles, nerves, and particularly the circulation, give rise to sensory stimuli of a great variety of forms which pass by the different nerves to the brain, and that these pass both in the brain and in the spinal cord to the motor neurones and those controlling muscle tonus. There is no doubt that in this way massage of the muscles may act to increase the muscle tone, and so increase the spasticity which is such a handicap in the use of paretic muscles. For this reason one should always be on guard, and watch the effect of the treatments upon the spasticity, and if this is greater than at first the time of the treaments should be shortened, and in particular should one diminish or omit the more stimulating procedures. I can only say that the use of percussion, vibration and vigorous friction can easily be overdone, and these modes may have to be dropped entirely. More leeway in the use of the forms of treatment which tend to relax the muscles can be given, such as passive stretching and the deep kneading movements though even these may very easily be used too vigorously, or for too long periods.

The method of treatment, which without doubt accomplishes the most in these cases of spastic paralysis, is that by exercise, the use of voluntary contractions of the muscles. Of course when the paralysis is very severe this voluntary movement of the muscle may be very feeble when it first returns, and may not produce any movement of the limb that can be seen. So that in the beginning of treatment we usually have to resort to assisted movements, and gradually as motion improves, substitute unassisted motion, and finally movements against resistance. These exercises may be given in a variety of ways, as by the command of the operator, by apparatus, such as the various machines known as the Zander machines, or ordinary gymnasium apparatus, or by occupations of various sorts, such as carpenter work, bicycle riding, modeling in clay, and a great variety of other activities, selected according to the nature of the disability left, and the movements which it is desired to improve. At one time this may be the very simple movements of the leg required in walking, gradually increasing in variety till such things as going over stairs can be accomplished, up to the more complicated movements of the legs and trunk required in dancing or certain games. Much more complicated are the exercises required to restore the use of the hand, and arm, from the simpler ones of closing and opening the fingers required for grasping, and holding, to the purposeful action needed for the use of the arm and hand in eating, dressing, up to the difficult ones required for handling small objects and actions which call for accuracy and speed, as in such things as writing or piano playing. Frequently we see improvement stop at some point in the long list of uses to which the hand may be put, and we usually have to be content with a partial restoration of its use. Any method by which the voluntary use of the paralysed muscles is improved by exercise of them may be included in the term of reeducation of the muscles, and include both those given by a trained massage operator and medical gymnast, and those given by the use of various machines, apparatus, gymnastics, occupations or games. The use of machines or gymnastics, in a class with an instructor leading and directing, or before a mirror so that the patient can see the way in which the movement is done, whether fully and correctly or not, is useful, and of especial advantage where a number of patients are to be instructed, and are capable of being varied in many ways to suit varying conditions, when carried out under the supervision of a capable instructor.

In every method of training patients in the voluntary use of muscles which have been damaged, certain fundamental points or principles need to be kept constantly in mind. The first of these which I wish to mention is that we are not likely to get real improvement without the attention and cooperation of the patient. So that with every exercise that is carried out efforts must be made to contract and relax the muscles used in the performance of the exercise, and in the proper way to carry out the movements, and we need to keep this in mind particularly when assisted exercises are being given, or when such apparatus as the Zander machines are being used. Then, in addition, we must not forget that, especially at first, and in the severer cases, the voluntary contractions are slow, and if the movements are hurried the action of the muscles will be more or less incomplete, and then improvement will be much slower, or even not obtained at all. So that at first all exercises should be done slowly, and the rapidity increased only very gradually

as the control of the movements improves. Then next in order to get effective control of the muscles which we wish to have used we should begin with single simple movements of a part by itself, or even at a single joint, and only proceed to more complicated movements in which a number of muscles must be innervated together or in succession, as control improves. The possibility of the return of motion in even completely paralysed muscles probably depends upon the fact that in very many lesions in the brain, if not in most of them, there are some nerve fibres which are not destroyed, but run through even badly damaged areas. After the acute stage following destruction of nerve structures by either hemorrhage or softening or inflammatory processes, the function of these fibres is generally lost temporarily, and the recovery of function by them accounts for the spontaneous improvement which we generally see after the acute stage of the disease has passed. Also we know that muscles suffer changes in structure in time from disuse, and the same thing may be true of the nerve fibres, so the early and persistent stimulation of nerve fibres by attempts at voluntary use may preserve or aid in the restoration of the nerve function. Certainly experience shows that persistent efforts at voluntary contractions of paralysed muscles is followed in most cases by some greater or less gain in the voluntary control of these muscles. Another fact, the explanation of which is still somewhat doubtful, but aids us in planning our campaign for reeducation of the paralysed, is that we almost universally obtain better contractions with efforts to contract the weak muscles, if these are made synchronously with similar movements of the corresponding muscles on the unaffected side when the paralysis is unilateral. Perhaps the most satisfactory explanation of this phenomenon is that in addition to the nerve fibres going to a muscle from the opposite side of the brain, there are also fibres for motion coming from the same side of the brain, and it may be that these uncrossed motor fibres take up to some extent the function of the crossed fibres which have been lost.

Lastly, let me emphasize once more the fact that in order to obtain the best results possible from the use of physiotherapeutic methods in the treatment of spastic paralyses we must first remove actual shortenings of muscles or tendons, the contractures, if these are present, and then try to lessen or overcome the spasticity of the affected muscles as far as possible by training, surgical measures, or other means, or both, and then through these methods of reeducation in the use of the affected muscles obtain as great an improvement as is possible in the individual case. May I caution you once more that this cannot be expected to be gained by short or easy methods of treatment, but call for intelligence and persistence, and particularly for cooperation at all times between the patient and the person giving the treatments. Where patients do not gain, or are dissatisfied with the results of treatment, it is always wise for the one who is giving or directing the treatments to go over the ground carefully in order to find the reason for this, if possible, and especially to make sure that one has used the best way to secure this cooperation of the patient, or whether we who are giving the treatments have not failed to secure this cooperation through impatience with stupidity, or by failure to explain to the patient how he must cooperate in order to benefit by such methods. Then, too, remember that when we try to get patients to continue treatments where the gains seem slow to them, and often are slow, we not only have to explain carefully what they may expect, but do not forget also that patience under slow progress can generally be obtained if we are careful to demonstrate to the patient any real improvement that we can find. Vague promises of future improvement, and exhortations to patients seldom are effective for long, and where we fail to control patients, naturally impatient for a complete recovery, not seldom the fault may be found in oneself, for the practise of all medical methods of cure is only a science in part, but also and always largely an art, and to practise the art of the cure of physical maladies requires both experience and tact, and, above all, understanding, and sympathy with the point of view of the sufferer, though not with all his whims or complaints.

The Treatment of Weak Foot

Harold D. Corbusier, B. S., M. D.

This article will attempt to deal with treatment only. The etiological factors of weak foot and its anatomical aspects are usually well understood and differences of opinion upon these phases of the question are only incidental. We must, however, keep in mind the fact that among people who do not wear shoes weak foot is an unknown ailment.

The term "weak foot" is used to apply to cases in which certain symptoms have arisen which cause disability of some sort, and not to the structural appearance necessarily. That is, a foot may be what is known as a "flat foot," or a pronated foot but have no symptoms, or there may be an unusually high longitudinal arch with symptoms. We should, however, consider any anatomically abnormal foot, such as the "flat" or "pronated," a potentially weak foot. Exceptions to this exist in the "racial flat foot," which rarely shows symptoms in the primitive state—it is only when such people wear shoes that they have trouble. Without going into this phase of the subject further, it might be remarked right here that two of the main factors in the cause of foot disabilities lie in the heel of the shoe and the confinement of the toes. This is true of the great toe especially, as it is changed from a hallux varus, of the native, to a hallux valgus, of the shoe-wearing people, hence a loss of stabilization and normal propulsion.

It might be well to review a few points in terminology which is sometimes confused. The typical weak foot is usually pronated, that is, the tarsus is rotated inward, the astragalus and scaphoid becoming prominent on the inner aspect of the foot, and the toes turning outward. The opposite of this action is supination, the foot being rolled over on its outer edge and the toes turned inward. These terms must not be confused with eversion and inversion, which imply the act of turning on the heel as a pivot, either outward or inward; in other words, the foot is either abducted or adducted without marked rotation of the tarsal bones. These two motions, moreover, take place at the hip joint, when the knee is fully extended, or at the knee joint when it is flexed, very little lateral motion taking place in the ankle joint.

During the examination of thousands of young men for military service in the World War an appalling number were rejected because of some foot abnormality. Most of these conditions could have been prevented if the general public had been sufficiently informed regarding the care of the feet. This refers particularly to the proper mode of walking and the proper sort of foot wear. A great deal was accomplished in rehabilitating the foot disabilities of the soldier and this was done by scrapping many of our old ideas regarding such defects. I refer particularly to the opinion held by most people that a weak foot is something which involves the foot alone. The common practice for relief of "flat foot" is the application of some sort of "arch support," either purchased at a shoe store or recommended by a physician. This method takes no cognizance of the real contributing causes, such as muscular weakness, poor posture, improper walking and standing. To merely apply a "metal support" to a foot in which the longitudinal or metatarsal arches are flattened and painful is a makeshift and often harmful. This splinting of the foot is disregarding the causative factors and usually means that the patient continues to be dependent upon such apparatus, instead of learning to take care of his own treatment. The metal plate method is just as poor a makeshift for the treatment of weak foot as the application of braces for the treatment of stoop shoulders. These remarks apply particularly to individuals under 45 years of age. We do encounter a few cases of very flaccid feet and some other conditions in which metal "arches" may be advisable, but even in persons over 45 and those of considerable weight, more lasting benefit can be obtained by the application of what we might call "physiological" methods of treatment, in contradistinction to the "mechanical" methods, so commonly used.

We sometimes hear the term, "congenital flat foot." This is a misnomer, as all babies are born with what one might call a flat foot, as there are no well-formed bones at birth, and the entire foot is plump, hence no evident "arches." The longitudinal arch begins to develop from the fifth to the seventh years. It is true, however, that most cases of typical weak foot begin at an early age and if mothers were taught to realize the early signs, usually called "weak ankle," there would be better opportunity for preventing many foot disabilities. All infants should be taught to walk properly as soon as weight bearing begins and better "first shoes" should be obtainable. These should have flat, flexible, non-slip soles, instead of the usual shiny variety with the soles turned up at the edges. Regular exercise should be given and the feet guided, teaching the child to turn the great toes toward each other both with and without weight bearing. Massage of the legs and resistive foot exercises should also be given as a part of the daily routine. If pronation has begun these methods should be religiously followed with the addition of a wedge (one-eighth inch at first) on the inner side of the heel, and also on the inner side of the toe, if the deformity is excessive. Even in very young children the exercises should be given in front of a mirror. Picking up marbles with the toes, taking care not to evert the foot, is a good method, as it is beneficial and entertaining. We also use the "log walk," which is a half round 4x4 placed on the floor on which the child is taught to walk with the feet inverted, gripping with the toes. At each end of this walk is an incline up which the patient walks. This is used more often in older cases who have a so-called short heel tendon. Exercises are given both for the children and adults on a "foot block." This is a board 15" long by 11" wide in the back and 9" wide in front. It is pitched downward at the back and higher in the middle. The front end contains a notch, for the great toes, and each side of this the board is cut at an angle so the other toes can grip over the edge at the same time the great toes are gripping in the notch. Patients are given one of these boards so as to continue daily exercise at home, always in front of a mirror. Postural exercises are also given and simple apparatus is used for general development in the cases resulting from malnutrition, or when there is poor coordination, or flabby musculature, resulting from any other cause. Careful attention to posture in children, as well as in adults, is essential, as an unbalanced body places undue strain on the legs and feet. We can not devote our attention to the foot alone, as the problem of weak foot goes much further and must be considered one of posture and muscle tone. Most of these cases require continued guidance to the feet in the form of strapping. A felt pad of various thicknesses is placed in the longitudinal arch and, after a protecting

bandage is applied, adhesive straps are placed beginning at the other side of the foot and carried inward, then over the instep to the outer side of the leg. One of these straps is applied directly over the scaphoid, which is usually prominent. The foot is, of course, held by the patient in supination, as far as possible. An additional bandage is placed over the adhesive, being drawn over the foot so as to retain the supinated position. Usually three straps are sufficient, two long ones and one short one. This strapping is not done to support the arch as much as it is to guide the foot. It will be noticed that this method of strapping differs from the one in general use, in that our straps are much shorter (about fourteen inches) and pass over the instep to the outer side of the leg; also a protecting bandage is used. The long strips of adhesive passed up the leg on the bare skin are objectionable to many patients and are not necessary. We must also remember the liability of adhesive poisoning, which is met with occasionally, and is most uncomfortable. Where it is necessary to use an adhesive instead of the regular surgeon's adhesive tape, one can substitute a glue mixture. This should contain nothing which will irritate.

The methods described in the preceding paragraph apply also in the treatment of adults, with certain modifications. As previously remarked, we consider that weak foot is not a foot problem alone, therefore, it is necessary to make a number of other observations of the case. Each patient's record includes an outline of the foot contour traced while weight bearing; on this sheet are marked the main points of deviation from the normal, abbreviations being used, so a rapid, graphic record can be made in a few minutes. This is very convenient for future reference as one can grasp at a glance all the salient points of the case without referring to the patient's card, which, of course, contains a full history with detailed notes as to present condition, treatment, X-ray findings, etc. It is very necessary in these foot cases to inquire particularly into a patient's occupation in detail. It is not sufficient to jot down "broker" or "machinist"—we must know just what sort of exercise the broker takes, if any, and whether or not the machinist works a foot machine or has much lifting to do, etc. Points of posture, methods of standing and walking are all recorded and naturally the sort of shoe which has been worn is of the utmost importance. In young persons the gait, both walking and running, is important and particular note regarding nutritional disturbances or protracted illness of any sort should be made. It is found very often that malnutrition and the infectious diseases are etiological factors in the weak foot of children. All points of tenderness, especially over the oscalcis, and under the longitudinal and transverse arches, should be examined minutely, as there are often discovered painful bursae in these locations. Tender points also occur at the posterior and anterior attachments of the plantar ligaments, caused by undue pulling on the periostium. Naturally the X-ray should be used freely in all cases of marked deformity. It is found more frequently than usually supposed, that accessory scaphoids have a great deal to do with the unsightly appearance in the region of the scaphoid in a pronated foot. It is also true that these accessory bones are sometimes one of the causes of weak foot. In the normal foot the tibialis posticus is inserted into the tuberosity of the scaphoid bone but when there is an accessory scaphoid the main part of the insertion may be into that the accessory having no firm union with the main bone, permits a certain amount of give to the posterior tibial, hence a loss of its stabilizing effect in preventing pronation.

From the foregoing it will be seen that we have found many factors involved in the etiology of weak foot, hence all treatment must be directed to the removal of these causes and the simple application of a metal "arch support" is not the way to accomplish this. To return to the details of treatment: After a complete history is taken the patient's feet are placed in either a leg whirlpool at 110 F. or in a still epsom salt bath at the same temperature. This is done in both acute and chronic cases, but the hot baths are especially beneficial in the acutely painful ones. The "leg-whirl" is used in the old cases in which there are hard, painful leg muscles and those with loss of tone. All cases with much edema and with large bursae are benefited by these baths and the heating of the part is preliminary to the next step in treatment. Both acute and chronic cases are next massaged. This must not be a "hit-or-miss" process and "just any one" can not give massage properly. The particular technique, length of time, etc., of this part of the treatment is left to Miss Griffin, our Head Aide. In fact, this treatment consists of the intelligent application of physical therapy and one must have as assistants thoroughly competent physiotherapists to obtain results. After proper massage has been given the patient is taught exercises on the foot block previously described. Acute cases are first given gentle exercises while seated. The regular exercises on the board include six or seven only. As the patient progresses he is taken into the gymnasium and put on the "log walk" and given other apparatus work. On the board we give the following:

1. Outward rolling—feet straight ahead and rolled over on the outer sides, modified also against resistance.
2. On outer side of feet, flexing toes.
3. Tip-toe—up and down slowly. This must not be given in cases with painful metatarsals. Later the tip-toe is modified by having the patient rise to the limit, then coming down slowly, without touching the heels, and rising again from that position. This latter is quite strenuous and must not be given at the beginning of training.
4. Toes over end of board, great toes in notch and small toes over the slanting edge; all toes are flexed over edge and then relaxed, not extended. The great toe, which is often in a valgus position, is thus separated from the others and over-corrected. Next the toes are "opened and closed," a very difficult process for most patients but one which should be persisted in.
5. Outward rotation of knees, with feet retained on boards and knees perfectly straight. Thus the action takes place at the hip joint and in the joints of the tarsus. This is an excellent exercise and results in marked benefit.
6. Squatting, with heels on board, also falling forward on the wall to stretch the gastrocnemius. These are especially necessary in patients with so called "short heel tendons."

It will be found that this contracted gastrocnemius exists in about seventy-five per cent of the weak foot cases in women. I consider exercises and muscle training essential in both the rigid and the flaccid type of foot, but no results can be expected unless the patient is trained with particular care and put through his paces at each visit. We find another procedure of benefit in persons with poor coordination. This consists of high stepping; the leg is raised with knee and thigh flexed to the limit, foot dorsal flexed and inverted. Then the step is taken by reaching forward fully extending the knee and plantar flexing the foot, still inverted, so the toe touches the floor first. This walk is given very slowly at first, requiring a good balance and rhythm. At the conclusion of the exercises the foot is strapped, as previously described. The pads of felt under the longitudinal arch are gradually added to until at least a

half inch is reached in thickness. When the patient has reached the point of relief from symptoms the active treatment is gradually discontinued and the foot measured for a "girdle," which consists of a pad fitted to the longitudinal and if necessary to the metatarsal arch. Imbedded in this pad is sometimes placed a flexible spring not more than one-half inch wide. The pad is retained in place by woven elastic passing over the instep. This is for the purpose of guiding the foot into a supinated and inverted position because if it is held thus the symptoms are relieved and no stiff metal form of "support" is required. This girdle is discarded as soon as possible.

Naturally an essential part of the treatment consists of wearing a properly constructed shoe. This must have a broad toe, made with more or less of a straight line on the great toe side, a narrow shank and a heel not over an inch in height. A lower heel is still more advisable after the patient has been trained to wear it. Many women say that they are not able to wear a low heel—this is to be expected because they have become so accustomed to one which is too high that the calf muscles are contracted. It is the height of folly to allow these patients to continue to wear high heels as no material benefit can be obtained in the treatment of a weak foot as long as it is undergoing the strain of a high heel and one which is usually pitched forward under the foot. Also many accidents are caused by this disregard of the anatomy and physiology of the foot. Very few feet can not be trained so as to be comfortable in a low heel. We know that high heels are frequently recommended for the relief of pain in the legs and this advice is gladly accepted, particularly by short women and young girls who wish to be "grown up." In an article in the Literary Digest of Feb. 16, 1929, there is a quotation from a Dr. Paul B. Roth of London, who writes to the Daily Mail on the subject of high heels. Dr. Roth, if the quotation is correct, gives some absurd arguments, in the defense of high heels, which are based on an erroneous concept of the use of the human foot. We recommend to others entertaining such ideas the reading of "The Human Foot," by Thomas S. Ellis of London. As a matter of fact, any heel at all is something to which the human foot must become accustomed and when it grows to the height of the present day style it becomes a positive menace. Propaganda broadcast by shoe manufacturers, coupled with a woman's desire to be in style, has been the cause of many cases of foot disabilities. We must give credit, however, to a number of manufacturers who are now making very sensible shoes. I do not refer to freaks which one sees so highly advertised, but to those made with knowledge of the requirements of the human foot, coupled with a conception of what is good looking. I only wish that it were possible for me to give here the names of some of these very human and brave manufacturers. The case against high heels can be summed up as follows: They throw the weight of the body on the heads of the metatarsals, thus causing claw toes, hallux valgus, bunions, etc.; the entire body is thrown out of plumb; there is a strain placed on the longitudinal arch, as well as on all other parts of the foot; there is caused an awkward and unsteady gait; the dorsal flexors of the foot are put on a stretch and the plantar flexors contracted; there is great liability of turning the ankle when the weight is thrown on such an insecure tread. These and other arguments against the high heel are brought to our notice daily. As a rule it is not necessary to prescribe a high shoe, especially in young persons, as we prefer to have a freedom of motion at the ankle. Shoes with "built in" arches are not used in this clinic except in very unusual cases of flaccid feet. The flexible or semiflexible shank is preferred. It may be necessary to make certain changes in the foot gear of the patient with a weak foot. Advancing the heel on the inner side for about an inch or more is advocated in some of the heavy chronic cases. Wedging on the inner side of the heel for the pronated foot is a usual practice. In certain cases complicated with a severe metatarsalgia it is well to use an "anterior heel," a cleat placed across the sole just posterior to the metatarsal heads.

We have learned to be quite dependent upon certain forms of electricity in some of the persistent and painful cases. Diathermy has proved to be of value in patients with arthritic tendencies. We do not, however, believe in neglecting the patient's general condition in these cases of arthritis and so-called "rheumatism." The mistake is too often made of expecting some sort of local treatment to cure a systemic condition.

I have refrained from discussing the operative procedures which are necessary in many cases to relieve certain abnormalities incident to a weak foot condition. These consist of tenotomies; bunion operations; occasionally an astragalo-scaphoid, or other arthrodesis. It goes without saying that these operations require a certain period of immobility but care is taken to make this as short as possible and to begin heat and massage early, as is the custom in all post operative work in this clinic.

In conclusion, I wish to make it plain that we do not expect the method described here to be a "cure all" but we are convinced that the conduct of these cases is rational therapy, although, admittedly, time consuming. In spite of the time required in attention to technique, we are far more satisfied with results now obtained than formerly, when the old system of rigid metal plates was used.

Plainfield, N. J.

Corrective Exercises

By Josephine L. Rathbone

Notes of a talk presented to the Massachusetts Physiotherapy Association, November, 1928

The problem at Wellesley College in the Department of Physical Education is not very much like that in hospital clinics. Only about ten per cent of the cases which come to the corrective room do so because they are suffering from acknowledged physical ills. They are chosen mainly because of poor posture involving some lateral deviation, occasionally of extreme extent, and foot lesions, which in most instances are giving the student no trouble. Dysmenorrhea cases are not common, and heart and appendix ones rare.

Occasionally we get a post traumatic problem.

One of the chief concerns in such a field is how to motivate the work for the student, and make her enjoy her two weekly periods and put some time on her individual exercises outside of class. The best attack for the college girl is that of appearance. The health values of good posture make a scant appeal to the young person who has never known what ill health is; and the economic values do not concern the socially prominent and affluent college girl; but the aesthetic value may. Women spend unlimited time, energy and money to approach their physical ideals, and quite rightly. Not all girls are interested enough in sports and general motor activity to build up beautiful, active bodies naturally, however, though some few of them see the value of that early. The majority need guidance in directing their attention toward that end. I am not one of the advanced intellectuals emphasizing at every turn the "cult of the nude," but I see in the balanced proportion and symmetry of the human body the foundation of all art.

There must be enough variety in an educational program to make the work interesting in itself. Self-testing activities, stunts, group activities, work to music, etc., will help. In a doctor's office this is not necessary: the work is sufficiently motivated by the desire to reduce pain or regain health. There also it may be possible to limit the number of exercises to very few, which would be deadening to groups reporting for work semiweekly for ten to twenty weeks.

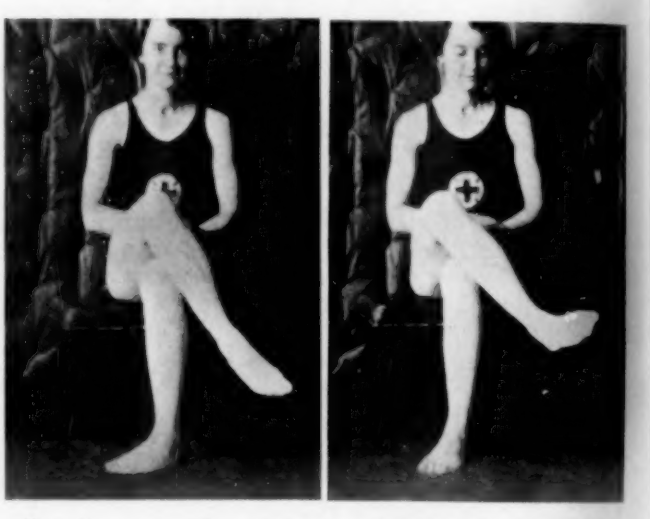
Our students wear a bathing suit, stockings and no shoes when they come to the corrective room; they work continuously for forty minutes, relaxation being given only as part of a prescription. Often all the rest allowed is that which one part of the body gets while another part is working. The body is divided into regions for emphasis at different times in the lesson though the relaton of one part to the whole is emphasized repeatedly.

I might say before describing some of the exercises which we use that we start all work in the lying position; that we try to emphasize continuously correct attitudes when standing and sitting; and that we consider the development in muscle tone the most important part of posture training. We place emphasis also on the fact that flexibility must never proceed without strength sufficient to maintain the newly acquired attitudes made possible by greater range of movement and loosening up of joint structures. This applies especially to cases such as scoliosis where nature has attempted to buttress against increase of deformity by limitation of motion.

FOOT EXERCISES

Flexibility—Massage

Foot circling, being sure that the supporting foot is in overcorrected position and that the movement brings the other foot into varus.



FOOT CIRCLING: Note overcorrected position of supporting foot and direction of movement towards big toe.

Achilles stretching.

In a forward stride position, bending the knees and lowering the weight so that the tendon in the rear foot is just on stretch.

In a "front leaning rest" position—This is also valuable for stretching the hamstrings, strengthening the abdominal muscles, adducting the shoulder blades and extending the upper back.

Strengthening—

Exaggerated correct position of feet with weight off.

Exaggerated correct position of feet with weight on.

Three count walking.

Linewalking.

In exaggerated correct position.

On toes, if work for the anterior arch need not be emphasized.

Towel tripping, picking up objects, toe gripping over a mat, foot writing, etc.

Most valuable are habitual correct positions. Such can be trained if one will make a practice of keeping the toes straight ahead and the weight on the outside of the feet, while brushing the teeth, combing the hair, etc.

GENERAL EXERCISES for the trunk, arms and legs.

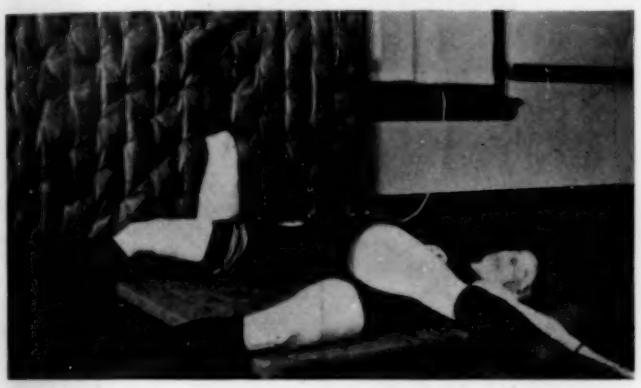
Lying—"Flexions"—Arm bend, back lying, alternate knee upward bending with double arm stretching over head (hands touching floor).

"Extensions"—Back lying alternate leg flinging forward with double arm flinging forward or sideward, upward *over* head.

Arm side horizontal lying, trunk twisting, touching alternate foot to opposite hand.

"EXTENSIONS" "FLEXIONS"

The starting position and final position of each exercise are shown.



TRUNK TWISTING

Count (1) and (3) Count (2)

Preparatory—Fishtail or double scissors with legs swinging together; side lying, upper leg raising; rolling from side to side.

Standing—Mimetic exercises.
All gymnastics taught well, with emphasis on proper body mechanics.

Hanging—Alternate knee upward bending.
Double knee upward bending with trunk twisting, etc.

(Start all hanging from toe touch position).

These general exercises involve a great deal of abdominal and lower back work, but some few exercises localize emphasis there a bit more. (In emphasizing flattening work for the lower back one should not be anxious to do away with the normal curves of the spine, but just to obliterate exaggerated curves and to get mobility.)

EXERCISES FOR LOWER BACK AND ABDOMEN

Back Lying—Abdominal contraction and pelvic roll (Mosher pumping, etc.).

Single knee bending to chest, leg stretching vertically, and lowering slowly downward while the other leg is held stationery in the knee bend position with foot on the floor.

Lying on the back with legs raised to the vertical, double leg lowering alternately left and right to the floor.

"Wall bicycle"—involves a stretch of the hamstrings hand, knee position—"Cat"—emphasizing flattening in the lumbar region during the "hump", and extension in the thoracic region during the stretch.

TREADING: Change of foot position in one count.

Treading.

Standing—"Leg freeing", hip or support grasp standing, one leg swinging forward and backward.

Hip or support grasp standing, heel raising and knee bending (uses legs also).

Hip grasp standing, forward bending of trunk (not in rhythm).

Wall exercise, forward and backward.

Forward: Touching only chest and toes to wall, pulling head and abdomen away.

Backward: Hold hand in lumbar curve; squeeze against it.

For dysmenorrhea we approve first and always general exercises, but add Mosher pumping and the knee chest position, etc.

The climax of all work for the trunk must be in front of the correction mirror, training of the senses to understand what correct position means, laterally as well as antero-posteriorally.

There are no "breathing" exercises. Natural breathing comes as the result of stimulation of the respiratory center in the medulla oblongata by an excess of CO_2 in the blood. We inhale when our body demands more oxygen. I only wish that work in a corrective room could be so intense as to call forth such a need. We do have exercises for chest mobility and for diaphram training, however. These we do in the knee-bend back lying position, for so-called breathing exercises done in the standing position tend toward undesirable forced correction.

Forced breathing with chest lifting, taking about four inhalations, and exhaling between them only by diaphram relaxing.

4 count breathing or W. Curtis Adams' "Pumping.'

Breathing with forcible rib stretching.

Breathing with arm raising sideward, upward.

EXERCISES FOR THE UPPER BACK AND SHOULDER REGION

Flexibility—

"Double arm swinging loosely forward and sideward to the horizontal, brushing the thighs in passing.

Single high arm circling, done quickly with clenched fist.

2 arm swinging "from cross to fly" (adapted from the Danish).

Single arm swinging "from cross to fly" with trunk twisting.

Same exercises in knee-hand position, forward bend standing position, sitting position, etc.

Forcible stretching of pectorals and extension of upper back.

1.

1—Stride or "Turk" sitting with hands on operator's shoulders, pressure applied by operator.
Long sitting with hands around operator's neck, pressure applied by operator.
2—Stride forward bend position grasping stall bars—pressure against scapulae, etc., standing, side bending ("Horse shoe").

Strength—

Rhomboids, infra spinatous, etc.

Arm side horizontal sitting—small arm circles, flattening shoulder blades.
3—Sitting—window pole raising and lowering behind head.

Biceps, deltoid, etc.

Arm bendings and stretchings (most interesting in series)—triceps, etc.
4—Hand-knee standing, arm bending and stretching.
Face push off from wall.

Upper back—held positions.

Spine stretching on height box.
5—Knee-bow sitting, upper back arching.
Back lying—chest lifting with upper back arching.

MISCELLANEOUS

Foldings and unfoldings, as used in natural dancing.

Relaxing—

This is considered very important and must be part of every lesson plan until it is mastered. Every possible means is used to train it.

2.

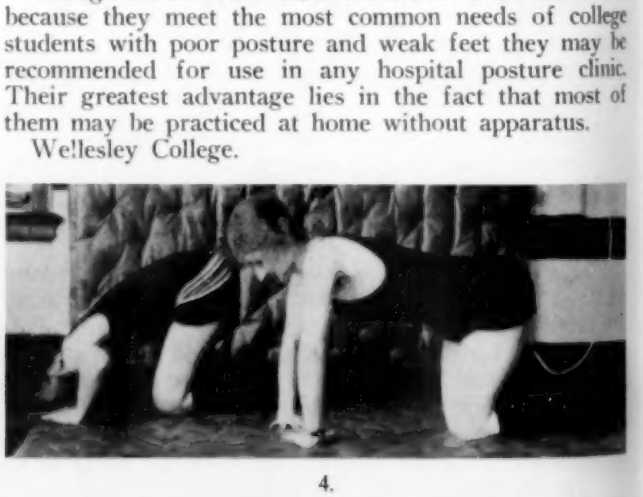
3.

Contracture exercises for the quadraceps in cases of traumatic knees.

I have discussed symmetrical exercises alone. Where does the correction of scoliosis come in then? Since no advanced structural case can ever be cured by exercise alone, at least all we can do in a short period is to correct antero-posterior conditions which predispose to an increase of lateral conditions and to so balance the body habitually that danger of increase in lateral deviation will be minimized. Dr. Arthur Steindler's Compensation Method is one which should be given careful consideration in every exercise clinic. By correction of faulty statics of feet, proper alignment of the upper segments of the body is made more possible and the danger of knee and back strain is considerably reduced.

Though the exercises described above have been chosen because they meet the most common needs of college students with poor posture and weak feet they may be recommended for use in any hospital posture clinic. Their greatest advantage lies in the fact that most of them may be practiced at home without apparatus.

Wellesley College.



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5.

Talk on Physiotherapy and Arthritis

By Loring T. Swaim, M. D.

It is with a great deal of pleasure that I speak to you tonight. The subject of arthritis having been for many years a rather neglected one, it is interesting to find people now asking for information about it. In approaching the subject of Physiotherapy and arthritis, one must have a broader point of view than has previously been held in regard to arthritis. For the moment, let us leave the subject of physiotherapy, and direct our attention toward arthritis, so that we may understand the fundamental principles more clearly when we get to the treatment of the disease itself by physiotherapy.

There are quite definitely three types of arthritis. A moderately large group are those in which the disease is undoubtedly due to infection. No one at the present time is willing to discard the theory that infection is a definite factor. The second group is the athropic, which has in many instances been classed with the infectious, and by many is believed to be a further stage in the infectious disease. The third, or hypertrophic group, is a disease of older people, resulting from the strain and the wear and tear of a life time. It is important to differentiate these types of arthritis when examining a patient, because the treatment is modified by the kind of arthritis found. Let us briefly summarize the data known about the different types.

Infectious arthritis occurs at any age, but is more common before the age of forty than after. It is primarily a periarticular inflammation, causing proliferation of the soft tissue with thickening of the synovia and ligamentous structures about the joint, with an increase in the fluid in the joint at first. The inflammation may be so superficial that it quickly dies out, and, subsiding, leaves thickened areas about the joint,. which may become, because of their position, causes of limitation of motion in the joint, although the joint itself is intact. This inflammation may increase so much and produce so much proliferation of the synovial tissues that a pannus forms between the joints, covering the cartilage, and so destroying the articular surface of the joint itself. If this occurs, limitation of motion is almost certain; depending more or less on the degree of destruction, fibrous ankylosis of the joint may occur, and this in turn becomes bony ankylosis. So that the infectious arthritis is an ankylosing, or limiting type of joint disease. It occurs in both sexes: is usually preceded by some acute infection, frequently connected with the alimentary tract. A focus of infection may at times be demonstrated.

Atrophic arthritis occurs between the ages of twenty-five and forty. It is more common in women than in men; usually occurs in the smaller joints; is apt to be persistently progressive with a great deal of general physiological disturbance, such as muscle atrophy, skin atrophy, degeneration of the soft tissues, loss of weight, and general low vitality. This also begins with periarticular proliferation of the soft tissues about the joint and extends into it, gradually destroying the cartilage and bone. There is a great deal of general bone atrophy with ultimate and frequent ankylosis, which is more apt to be bony ankylosis than fibrous. Therefore, both the types so far mentioned, the infectious and the atrophic, are what are known as ankylosing types of arthritis; and this is of importance to remember in the treatment of both these diseases.

Hypertrophic arthritis occurs late in life as a degenerative process, appearing more frequently in men than in women. It is often ushered in without symptoms and is gradually progressive at points of strain. There is a hardening of the bones; lipping at the edges of the joint; and a tendency to spur formation, chiefly in the larger joints, such as the hip, back, knees, and cervical spine. This occurs at an age when the general physiology of the individual is in all probability slowing up. He is less resilient; less able to cope with life; is changing to the down hill path. At this time, in the heavy anatomic type, in which hypertrophic arthritis primarily occurs, the bone structure, where strained, tends to become thickened; and nature tries to buttress the points of injury. This type never tends to ankylosis, but becomes limited in motion, not through fibrous thickening, which is not at all common in this disease, but because of the overgrowth of the edges of the bone, making the interference with motion an entirely mechanical one.

There are a few etiological factors which I would like to mention briefly. In studying an arthritic, there are several points to be noted. First, look at the patient as an individual who has certain potentialities which we may call heriditary characteristics, as we all know that heredity plays a part in arthritis. Individuals in the same family are often afflicted at about the same age with the same type of arthritis. For this reason, the type of anatomy of the individual patient is of importance. People are roughly divided into three types of anatomy—the slender type, the intermediate, and the heavy. This does not mean weight, but bone structure and type of viscera. The slender individual is light boned, the acrobatic type of person whose body is built for flexibility and whose abdominal organs are loosely attached in order to meet this flexibility of bony structure. They are apt to have a fish-hook stomach with a short small intestine. It is in this type that atrophic arthritis so frequently occurs. There people are apt to become tired with long strain, are high strung, nervous individuals, in whom it is difficult to produce proper nutrition—partly on account of their activity and partly on account of their short small intestine. The intermediate type is, as its name suggests, a group between the extreme heavy and the extreme slender, who have some of the characteristics of both, and may be designated as intermediate, tending towards the heavy or slender. The heavy type are heavy boned, close set, stocky people with rather tight ligaments, lacking in flexibility as compared with the slender, with heavy viscera, closely attached, with large pouch stomach and a long small intestine, which does not have to move out of place in order to accommodate the motion of the trunk as much as is necessary in the slender type. These people are well nourished; are strong, enduring people; not so easily fatigued, nervously or physically. They are far more deliberate. Among this group are found the hypertrophic arthritics.

The second point is that of body mechanics. One of the characteristic things found about arthritics of both the atrophic and hypertrophic types is their faulty posture, which causes unnecessary strain on their joints. Another aspect of the faulty use of the body is that it produces abnormal physiology. It is difficult sometimes to estimate the amount of physiologic disturbance in the heavy

type. There we find that bad standing position and bad mechanics produce more joint strain than in the slender type, who are more flexible. It is at this point of strain in the heavy type that we find the greatest amount of joint change, which has always suggested to the medical profession that this type of disease was primarily a mechanical, traumatic disease. The faulty use of the body in the slender type, however, is apt to produce a great deal of abnormal physiology. They invariably have low blood pressure, subnormal metabolism, subnormal temperature. They are undernourished, physically depleted; are apt to have spastic constipation, and show the general symptoms of a person who is far below the average physiological stability. It has been found that by correction of this faulty posture the physiology often would respond, and the patient would regain his physiological balance, and the resistance and vitality, which seemed to have been lost as a result of this mechanical physical condition.

Among the chief things noted in the disturbance in the atrophic cases are the circulation, the digestion, and the muscle tone. The digestion is often poor; the muscle tone is often lost; the circulation is extremely unstable. This is manifested by the cold hands, cold feet, and the vasomotor disturbances found present in a large number of the cases—often present before the arthritic symptoms are manifested. Another factor which we find frequently in arthritis is fatigue—chronic fatigue over many years. The patient often states that he never knew what it was to feel well, and never knew what it was to feel rested. He was tired in the morning and at night. Another thing which must be taken into consideration is the dietetic factor. We are beginning to believe that the type of food is extremely important in these cases—more so in the atrophic than in the hypertrophic. I do not feel that it is the quantity of food so much as it is the type of food that matters. I feel that the demineralized, purified foods, which we have so long used in this country, and, which in some cases we find are the main staple of diet, such as meat, white bread, potatoes, a very high starch diet with a great deal of sweet, has a very definite effect in lowering the vitality, and, combined with the type of the individual, the postural conditions found, plus the indigestion and fatigue resulting from the wrong use of the body, may all be important factors in predisposing to arthritis. Add to this bad habits, chill, sudden nervous strain, shock, chance infections, overwork, and the ground is laid for the development of the joint condition. These many factors we find present in most of the cases of arthritis, principally of the infectious and atrophic groups.

Now, having covered the problem of arthritis very superficially, let us take up the question of the treatment through Physiotherapy. For generations Physiotherapy has been found to be effective and helpful in the treatment of arthritis. If we look through the kinds of Physiotherapy technique which have been effective we will see that massage, electricity, hydrotherapy, heat and exercises, all have been found to be of value. If we analyze what all these different types of physical therapy do we will find that they affect the circulation.

Let us take massage first. The primary object of massage is to accomplish two things—to give muscles exercise passively where their tone has been lost, either because of pain or of loss of conscious control. Secondly, massage presses out of these muscles the stagnant blood supply, allowing a fresh blood supply to enter. This same thing is true of the skin. The redness of the skin after massage is indicative of superficial circulation. Electricity has more or less the same effect in making a contraction of the muscles by stimulating the nerve supply and so causing a change in the circulation wherever it is used. Heat, whether it is used in the way of moist heat, dry heat, or diathermy—again has its effect through the circulation to the surface or to the point where the heat is applied, causing engorgement of the vessels and a fresh blood supply which helps repair damaged tissue. These first three means of treatment can be used before active exercise is possible. The aim and object of these three is to make it possible for the patient ultimately to regain normal function of the muscles and joints so that the final improvement can be accomplished by the patient's own active exercise. The joint was meant to be used. It was meant to have motion. Any joint which is not used is not healthy. The final health then of an arthritic joint will depend largely on the activity which it has regained. A muscle was meant to contract. Its health depends on its contraction. If not used it degenerates. Consequently, the normal muscle use is the primary object to be accomplished by Physiotherapy. So that ability to exercise is, in my opinion, the final test of treatment.

I am not going into details as to the kind of electricity or the kind of heat which shall be used, or the kinds of exercise. I would, however, like to have you look at exercise from a broader standpoint than the joint alone. One of the great faults that we have fallen into in treating arthritis is to look at the joint as a separate structure. The joint can have no normal physiology without the normal physiology of the structures which nourish it. In other words, the normal condition of a joint depends upon the circulation about that joint, and the more normal the blood is that comes to the joint the better the repair process will be. Our object then is to develop circulation in the joints, and this can be best accomplished by developing good circulation at its source. The vasomotor disturbances causing the blueness and coldness of the hands, the low blood pressure, the subnormal temperature, all seem to be affected by normal use of the body itself. Consequently, I recommend in arthritis that the exercises from the very start be directed towards the thorax, abdomen and trunk, which will increase the normal physiology and so affect the extremities which are dependent upon this for very life and health.

By this I mean breathing exercises, abdominal exercises, trunk flexion, and hyperextension. Oftentimes abdominal massage will also improve this extremity circulation through stirring up the many congested areas in the abdominal cavity. These body exercises also improve digestion, assimilation of food and elimination—two factors which are just as important as the kind of food that is given, because the best food can be discarded by poor and inefficient digestion, and will leave just as many toxic poisons for absorption as wrong food, if the gastrointestinal tract is sluggish. Constipation is one of the frequent complaints of all arthritics.

The final step in the treatment of joint conditions is the occupational work. This, of course, is primarily for the Occupational Therapists, but I *consider it a branch of Physiotherapy,* which has paved the way, making occupation possible. Occupation, of course, gives the normal use of the joint by the individual himself and is the step between the normal life and that of the restricted arthritic.

It is important to appreciate—and I have left this to the last because I wish to emphasize it—that the infectious and atrophic, the ankylosing types, as soon as the active disease is quiescent enough, must be exercised in order to prevent the stiffened joints from fusing. Such joints should never be completely restricted by any form

of apparatus, and should be encouraged to move as far as they will, but never should be forced by any Physiotherapist without instructions to do so. Forced manipulation will often cause a recurrence of the inflammation and prevent progress. Active exercise to the point of toleration by the patient himself does no harm, and prevents ankylosis. In the hypertrophic type, exercise is to be restricted, as these joints tend never to become ankylosed, and exercise causes more irritation of the bony overgrowths, thus making them still larger and more limiting. Rest causes cessation of the growth of the spurs and increases the amount of motion by relieving the soft tissue irritation which is traumatic.

This is why it is important to recognize the different types of arthritis from a Physiotherapy standpoint. The correction of body mechanics in the atrophic case, and in the slender individual, is important, because this relieves the mechanical strain, but primarily because it promotes better and more normal physiology. In the hypertrophic, the correction of body mechancis relieves the mechanical strain which is causing the joint changes. Incidentally, it corrects the physiology, so that the ravages of time are not so apparent.

Let us remember that Physiotherapy aims at restoration of circulation and through this the repair of the joint and muscles, so that the most normal functional use of the body as a whole, and the joint in particular, can be obtained. Never be satisfied until this has been accomplished to the best of your ability.

Physical Therapeutic Technic

By Frank Butler Granger, M. D.

Late Physician-in-Chief, Department of Physical Therapeutics, Boston City Hospital; Director of Physiotherapy, United States Army; Medical Counselor, United States Veterans Bureau; Member of Council on Physical Therapy, American Medical Association; Instructor of Physical Therapeutics, Harvard Medical School; Assistant Professor of Physical Therapy, Tufts Medical School. With a Foreword by William D. McFee, M.D., Boston, Mass. Octavo volume of 417 pages with 135 illustrations. Philadelphia and London: W. B. Saunders Company, 1929. Cloth $6.50 Net.

This is a book on Physical Therapy technic by an author that every member of the American Physical Therapy Association knows. Dr. Granger states that this book has not been written for the specialist on Physical Therapy. The technic given covers Dr. Granger's personal experience of twenty-five years of Physical Therapy and for this reason makes it an invaluable book for reference in technic.

In his preface the author makes a statement that every member of the association will welcome: "The value of massage cannot be too strongly stressed, and my constant plea throughout this book is that as soon as the physician needs an assistant or a technician, the common practice of training an office secretary be abandoned, and a man or woman trained in massage and well skilled in muscle re-education be secured. The expense of this step will be more than counter-balanced by the infinitely better results thus secured."

It is believed that this book will be a worthwhile reference book for every member to have.

Arthritic Pain in Relation to Changes in Weather*

E. B. Rentschler, M. D.
Fellow in Medicine, The Mayo Foundation

Late in the summer of 1927 we decided to make daily records of the clinical status of hospitalized patients with arthritis, and to compare these with the daily ups and downs of the barometric pressure. In order to avoid mental bias these grades were all posted before the barometer and other instruments were consulted. Each day the pain of each patient was appraised on the basis of the patient's statement; the group was appraised, as a whole, and the figure representing the average comfort or discomfort of the group was plotted on the same chart with the barometric pressure, the temperature, and signs indicating cloudiness, winds, or storms with rain or snow. For much of the time we charted also the degree of humidity, and a figure representing the electrical charge of the air. In most of the following discussion we shall, for the sake of convenience, speak of the curve of average comfort or discomfort as the curve of pain. It may well be objected that a correlation between changes in barometric pressure and in pain cannot be determined since pain is subjective and is not amenable to measurement. However, much of the mathematics of correlation has been worked out in the fields of education and psychology where grades are used and not accurate measurements.

Jan. 11, 1928, we presented a preliminary report which was published Mar. 28 in the Proceedings of the Staff Meetings of the Mayo Clinic. More detailed studies have confirmed the results recorded at that time. This report presents the results of observations over a period of 365 days and includes a study of 367 patients with arthritis. The longest period of observation for any one patient was one year; the shortest was two weeks. Most of the patients belonged to the group with the so-called nonspecific infectious arthritis, and among them were found nearly all of those who seemed to be influenced by the various weather factors studied.

We found two types of correlation between the variation in intensity of pain as reported and the variation in barometric pressure. For seventy-two per cent of the time the patients claimed to suffer more pain as the barometric pressure fell, and with a rise they experienced relief. We think of the relation as a positive one. For twenty-one per cent of the time the curve of pain went up when the barometric curve went down and vice versa. The correlation was just as marked but, as the statisticians would say, its sign was negative. Among ourselves, as we studied the charts during periods in which this negative relation existed, we came to speak of one curve as being the mirror picture of the other. On one occasion the position relation was maintained uninterruptedly for sixty-four days. The correlation was $+0.864 \pm 0.024$, which is very high.

When the figures for the whole year were charted, it was found, as was to be expected, that the inclusion of data obtained during the occasional periods in which the relation was negative or inverse and during the short periods (constituting about 7 per cent of the whole time) in which there was no obvious relation between the curves, brought about a lowering of the coefficient of position correlation. Actually it was only $+0.267 \pm 0.031$.

Even the best weather prophets among the patients could rarely predict a change more than six or twelve hours ahead so we saw no hope of getting better correlation coefficients by charting the degree of wellbeing or pain on one day with the barometric pressure or the weather of the next.

The curve of pain in one of these arthritis prophets ran almost parallel with the curve of barometric pressure for about seventy-seven per cent of the time, and in an inverse direction twenty per cent of the time.

A study of the reports for the entire year showed that when the severity of the pain was not in accord with the changes in barometric pressure, it was almost invariably related to the presence of storms or marked changes in the weather. The coefficient obtained is $+0.425 \pm 0.028$, which is much higher than that obtained for the whole year with data for pain and barometric pressure.

For almost ninety per cent of the time, the presence of a storm was associated with increased pain. This held true not only for days when there was rain and snow but also for those days when the weather was definitely cloudy. We noted also that the patients usually complained less on clear, sunshiny days and the general improvement following a continued period of fair weather was always striking. Thus we see that general changes in weather constitute an important factor in the production of pain.

In a study of the curves we noted two types of inverse relationship between pain and barometric pressure. In one case the barometer dropped while the pain got better and in the other the pain got worse while the barometer rose. An analysis of the record at these times showed that when a rising barometer failed to bring relief to the patients it was generally because a storm had come with rain or snow.

In addition to the other studies we have made daily observations of the temperature, humidity and atmospheric electricity. So far as humidity is concerned, we have not been able to show any definite relation with arthritic pain. It would seem that humidity alone is not an important factor, but it is possible that further work may show that in combination with other factors it is of some significance.

The same may be said of temperature. Although the patients as a group have complained most of pain during the cold winter months, our records of individuals studied throughout the entire year do not show any striking variation in pain in relation to warm and cold weather. Of course, it must be remembered that during the winter the patients are confined to the hospital which has a fairly constant warm temperature. In the autumn of 1927 and also of 1928 we were impressed with the fact that a large number of the patients became gradually worse with the increasing cold and the grey fall days, that usher in our winter, and later we found that although the cold had increased, days of sunshine still brought improvement.

Half a century ago, Mitchell and Everett suggested the

*Abstract of paper reprinted from the Proceedings of the Staff Meeting of The Mayo Clinic, No. 18, May 1, 1929.

possibility that electricity might play an important part in producing pain. In an attempt to investigate this, Dr. Sheard and Mr. Halstead, at our request, supplied apparatus whereby the electric charge of the atmosphere could be measured daily by an electroscope. Observations were made over a period of three months. Measurements were made not only each day, but often several times a day so as to detect possible variations coincident with the sudden appearance of electric storms. At no time could we demonstrate any relationship between the condition of the atmospheric electricity and that of the patients, but we do not feel that this avenue of research has been closed. With a different technic something of value may yet be learned.

We agree with Mitchell and Everett that there is a relationship between storms and the pain of arthritis, and that the increase in pain must be due to the summation of that group of changes in the atmosphere that constitutes a storm. We believe that barometric pressure is one of the most important factors, and when the curve of pain fails to follow that of the barometric ups and downs it is because the influence of a storm has come in to complicate the picture.

Several theories have been suggested to explain this influence of storms on the pain of arthritis but all are vague and unsatisfactory.

SUMMARY AND CONCLUSIONS

This study was undertaken, not to prove the existence of a relationship of arthritic pain to weather change, but to determine whether or not such a relationship actually exists. We realize that subjective sensations of patients are hard to interpret and to evaluate quantitatively and that it is difficult to rule out the influence of suggestion. In spite of this we now feel certain that many of our patients with arthritis can, through an increase in the severity of their pain, sense the approach or presence of storms.

In a group of 367 patients studied for a year there was a positive relationship for seventy-two per cent of the time between the curve of pain and that of barometric pressure. For twenty-one per cent of the time the relation was equally definite but as one line went up the other went down. In only seven per cent of the time was a relationship undemonstrable.

For more than ninety per cent of the time there was a relation between the presence of storms and an increase of pain. Observations on humidity, temperature and atmospheric electricity were inconclusive although it is still possible that these agents working together have some effect.

DISCUSSION

L. G. Rowntree, M. D., Division of Medicine: As Dr. Rentschler has indicated, Dr. Vanzant and he presented data at the end of a four months' study; the data presented tonight represent a period of a year, confirming conclusions drawn at the end of the first four months. We have accumulating evidence all pointing in the same direction.

Most patients with arthritis experience pain with storms. We cannot get away from this fact. Patients with gouty joints do not experience this type of pain but those with the nonspecific infectious type of arthritis and those with marked vasomotor changes do show the influence of storms. This work confirms some of the so-called superstitions of ancient folk-lore. I believe that disturbed circulation and the vasomotor system have something to do with this pain. Until we know more about that, it is better not to speculate but simply to recognize that a relationship exists. I believe, also, that this work is much more far-reaching in medicine than merely its relation to arthritis. It probably applies even more forcefully to psychic and mental process and perhaps, to some extent, to the functions of various organs.

There is a great need for additional records of reactions in intelligent subjects. Records kept by the patients themselves of their symptoms and of conditions of the weather will furnish valuable and interesting data.

We may be criticized, perhaps justly, for taking subjective evidence from patients. We have asked for criticism and the most helpful suggestions we have had, have come from within the institution, particularly from Dr. Sheard. He raised the question as to whether it is legitimate to compare and show relationships between temperature and pressure factors which are measured accurately in units, and degrees of pain, which obviously must be based on the statement of patients. He even raised the question as to whether temperature and pressure have anything to do with the pain. This question is, of course, most important, and thinking about it gave me an insight into a possible approach to an explanation of the phenomena observed. We can show that change in temperature and in pressure can produce pain, even in the normal subject. It takes no more than a finger caught in a door or in contact with a hot dish to prove that. In disease, however, pain results from stimuli infinitely smaller than those necessary for the same effect in normal persons. The extreme sensitiveness of patients with rheumatic fever to slight motion, such as the jar occasioned by someone's walking across the room, or to slight pressures such as the weight of bed clothes, is commonly observed. In patients with erythromelalgia or Buerger's disease, the pain is affected by extremely slight changes in position or pressure.

Patients with arthritis are so very sensitive to changes in temperature that they often, of their own accord, wear flannel underwear. The painful joint will be affected by a draft when normal persons are sitting in absolute comfort. A normal individual never notices the weight supported by his joints when standing or walking, whereas patients with arthritis suffer pain and may even suffer injury from the pressure of their own body weight. With this fact in mind, doesn't it seem possible and even highly probable that arthritic joints might be sensitive to even slight changes in atmospheric pressure and temperature?

This work on the weather in relation to pain is, in my opinion, an important opening into a larger field. The results reported in arthritis are as accurate as can be obtained with present methods of study. I believe that our conclusions are justified but we must proceed carefully until we know more of what is transpiring. Later this study perhaps can be carried advantageously into other fields of medicine.

Rochester, Minn.

Physical Therapy Department at the Medical Center, New York City

By Norman Edwin Titus, M. D.

For many years "baking and massage" were done at Presbyterian Hospital in New York in the same way that it is done in hundreds of other hospitals. However, in 1925 it was decided that more serious consideration should be given to the little room in which this was done and the writer was asked to take charge of the work. This all happened in the old hospital at 70th St. and Park Ave., where there were two rooms. One was used for massaging men and the other, which was connected with the accident room and had to be emptied out and cleaned up every day, was used for massaging women. When serious consideration of the work was started, a diathermy machine was procured and two mercury arc lamps. This apparatus and a few lights comprised the entire equipment but even with these few things the results began to show and in the winter of 1927 some children in a Sunday school gave money to the hospital to buy some more mercury arcs. Then another technician, making the total three, had to be engaged and ultraviolet was given to the ward and private patients with these portable lamps that were a gift to the hospital.

The staff at the Presbyterian Hospital began to show increasing interest in the work and a portable whirlpool bath was installed in the clinic for the treatment of fractures. When the plans of the new Presbyterian Hospital and Medical Center were drawn up, physical therapy had so established itself that there was not much trouble in getting space allotted for a real department. However, this space was very small and then came a struggle with the architects and the "powers-that-be" to get ample room. Finally one floor of the Vanderbilt Clinic was given to the department which has a working floor space of 8,000 square feet.

The department has grown so that there are now five full-time and two half-time technicians working in the clinic department. There are also two technicians who have a small office and sort of garage where they keep portable ultraviolet lamps and portable high frequency and low voltage machines and from this office they go to the wards and treat exclusively the ward patients. In the private pavilion there is also a branch office with a technician in charge, who goes to the private patients' rooms and administers such physical therapy as can be given to bed patients.

The main hospital moved uptown in April, 1928, but the clinic was not opened until July of that year. Unfortunately, for the writer's personal pleasure he was in Europe and could not be present at the formal opening. Dr. Charles F. Sharry, who is assistant chief of the clinic, and Miss Boxeth, who is the chief technician, started the work going and the letters they wrote during the summer of 1928 boasted with great pleasure that they were having between fifty and sixty patients a day. In October, when the director was able to return and take charge, a staff of five assisting doctors was established to see new patients and watch treatments and since then the growth has been extraordinary.

The doctors serve without pay at least one day a week so that there is always a physician in charge and on duty in the department.

The main trouble with the department at present is that it is flooded with too many patients. This may seem strange to many readers but the entire staff of the hospital enjoys making every use possible of the department and it is difficult to keep the attendance under two hundred a day. The duty of the director is to go to the other departments of the clinic in consultation and look for cases to treat. But should he exercise this part of his job, it would be physically impossible to handle the patients in a department even as big as this one is. It is a real problem how to limit the number of patients and there is a waiting list at present of two weeks for chronic cases that do not need immediate treatment.

The main room of the department is a large one which has fifteen cubicles arranged in it so that at least fifteen patients can be treated individually at one time. This is divided into two sections, one for men and one for women, and with seven high frequency machines, twenty light and infra red applicators and three low voltage machines; the equipment is still not sufficient to handle the work. Next to this room there is a large room divided so that it can be used for four static machines. Only two are installed at present because there is not sufficient help to handle any more. The other two will be installed shortly when the personnel is increased.

Opposite the static room is one of the best hydrotherapy rooms in the country, with eight dressing cubicles, three electric light bath cabinets, four whirlpool baths and two continuous baths.

Adjoining the hydrotherapy room is a rest room for six patients. Continuing through that room, one enters the ultraviolet room which has lockers along one wall and at one end there is a partitioned off portion containing eight treatment tables and four mercury arc lamps which are suspended from the ceiling to be sixty inches away from the patients below. All the patients in this room are required to supply their own goggles, which they buy in the ten cent store, or they can buy smoked glasses by prescription from the hospital pharmacy for twenty-five cents.

Beyond the ultraviolet room there is an office for the director which contains a small locker space for the personnel to use in changing uniforms. This room also contains a large fuse box which distributes the current to all machinery in the department. This makes it very easy to change fuses in case they blow.

The attendance in the department has been so great for the past few months that the number of treatments is averaging around 9,000 a month. Since the department opened there have been over 2,500 patients admitted and it is usual that about fifteen new patients are admitted each day. What will happen within the next year, no one knows. It is impossible to expand and it is likewise impossible to accommodate all those who need physical therapy. It is hard on the personnel to be working at full speed at all times but the main gratification is that our results are so consistently accomplished that the demand for our services is increasing almost daily, and there is less friction, we are told, in the department than in any other in the clinic.

The records used are according to the Beekman St. Hospital system and every patient has an appointment for treatment in order that we may regulate the traffic. All new patients are prescribed for by one of the attend-

ing doctors and after a patient has had a stipulated number of treatments, he is reexamined by one of the attendants. If necessary, he returns to the clinic from which he came for consultation or suggestions as to further treatment. All appointments are made by an aide and the actual histories of the patients that are needed for the following day are requisitioned each night from the record room. This is only done when patients are to be seen by the doctor on duty. If they are not to be seen, the prescription sheet of the department is used on each visit.

The standard charge per visit in the clinic is one dollar but it is a regrettable fact that most of the patients do not pay the dollar. As an example, one month this winter there were 2,250 visits and the total receipts were just over $1,000. For the past six months the income of the department has shown a consistent increase and recently when the director asked for another technician, the superintendent stated that such a request could not be refused because the department was about the only one in the hospital that was showing a definite profit.

The department is used for the instruction of doctors and medical students because it is connected under the same roof with the College of Physicians and Surgeons of Columbia University. It is hoped that within the next year courses can be given for technicians but plans for this work have not been completed because arrangements have to be made with members of the faculty of Columbia and the teaching staff of the hospital.

The visitors' book shows many well-known names already and Miss Boxeth has gained a reputation as a guide and demonstrator for people who have come from all over the world.

This story of the Physical Therapy Department at the Medical Center of New York could not be concluded without specific thanks being given to Mrs. Welsh, our efficient aide who runs the desk, Doctors Charles F. Sharry, Robert Muller, Cassius Lopez deVictoria and Robert Muller; and special thanks go to Miss Mathea Boxeth, who is really the big boss although she will not admit it.

Office of the Director of Physical Therapy,
Presbyterian Hospital, New York.
May 24, 1929.

The Use of Diathermy in the Treatment of Pneumonia

H. D. Offutt, Major, M. C.

In discussing the treatment of pneumonia by diathermy, I wish to warn you that this article does not deal with miracles. Dr. Byron S. Price first used diathermy in the treatment of pneumonia in 1917. In 1922 Dr. Harry Eaton Stewart of New Haven began the use of diathermy in the treatment of pneumonia on a large scale. Since that time its use has spread, facilitated by the manufacture of more easily portable high frequency machines, until recently we see by the newspapers that it was used in the treatment of King George. I will present a brief resumé of its effects, both objective and subjective, in cases of pneumonia, as I have noted them in the treatment of a series of one hundred cases at Walter Reed General Hospital, Washington, D. C.

Most of us in treating pneumonia use, or have used at times, some form of heat applied to the chest. If not applying it directly, we have used a pneumonia jacket to retain the heat. Diathermy is the application of heat by means of generating it in the body, using the tissue resistance to a high frequency current to generate the heat.

In pneumonia we have an acute infection with capillary stasis and an outpouring of lymph and cells into the alveolar spaces. These are conditions to be combated. We also have pleural involvement with pain and its subsequent effect of diminished chest expansion, lessened alveolar intake and cyanosis.

Binger and Christie of the Rockefeller Institute have shown that the temperature within the chest can be raised one and one-half to two degrees centigrade by the application of diathermy through the chest. This rise in temperature can be increased by cutting off the circulation and preventing the dispersion of the heat by the blood. In other words, the lung is a blood-cooled organ rather than air-cooled, as cutting off the air intake to a part of the lung does not materially alter the temperature of the lobe involved. Where we have consolidation in the lung the action of the blood-cooling apparatus is retarded and a greater rise in temperature results. If it is true that one factor in the body's defense is the production of enzymes developed by the leucocytes and that the activity of the enzymes is enhanced by a rise in temperature, then may not the fever be nature's attempt to activate these enzymes? Supposing that this theory is correct, then the use of diathermy is rational in so far as it takes the burden of a certain amount of heat production from the body.

The heat produced also relieves the pleuritic pain, allowing more comfortable expansion of the chest with deeper breathing, better oxygenation, relief from oppression and cyanosis and the patient often falls asleep. Heat also tends to dilate the blood vessels, allowing an increased blood supply to the involved area, thereby giving a better supply of white cells in the early stages and increasing the rapidity of resolution in the later stages. In cases brought in suffering from shock, the heating of the blood supply in the chest is similar to Crile's technique of heating the blood supply through the liver. The results are excellent. Many of our pneumonia cases have suffered from the shock of transporting them long distances and in these cases diathermy has been an efficient remedy.

The technique of the treatment is rather simple but should never be left to untrained hands. Any high frequency portable machine with a frequency from 800,000 to 1,500,000 and having sufficient voltage to maintain 1800 to 2,000 milliamperes steadily may be used. Plates of block tin alloy twenty-two to twenty-eight gauge are cut approximately eight by ten inches, the corners rounded and the edges smoothed or folded over about one-eighth of an inch and rolled. These are used for electrodes. The conducting cords may be attached to the plates by any suitable clip. Personally, I prefer safety pins to clips as they cannot slip loose; a loose clip usually causes a burn. I cut a flap on one end of the electrode and fold it back. The safety pin is pinned through this flap and lies on the electrode away from the skin surface. The surface of the electrodes are moistened with warm, soapy water. One is placed under the back reaching well up and a towel is slipped under it to hold it firmly against the skin. This can be done with very little disturbance to the patient. The other electrode is placed on the anterior chest wall, and, having been moulded to it with the hands, a light shot bag or other retainer is placed on top of it. The chest is then covered and we are ready to turn on the current. Before turning on the switch the spark gap should be inspected to see that it is closed completely. The switch is then turned on and the spark gap opened slowly until the milliammeter reads about 1800. It usually takes about five minutes to reach this point. The treatment lasts about twenty-five minutes and then the spark gap is slowly closed and the switch turned off. The patient is disconnected from the machine and the plates removed, disturbing the patient as little as possible.

When treating children the time of treatment and the milliamperage should be lessened proportionately. With delirious patients it may be necessary to hold the plate on the chest or both plates, in place, with the hand. Tight binders around the chest, for the purpose of holding the plates, restrict the chest movements and give the patient further sense of constriction. Before the treatment, it is well to explain to the patient just what sensation he should expect to experience and thereby gain his confidence. He should feel a sensation of pleasant warmth in his chest and to the skin over the chest and upper back. No uncomfortable sensation should at any time be felt as a result of the treatment. Skin burning is due to the electrode being raised away from the skin allowing sparking, or the spark gap being opened too rapidly, not allowing the current to overcome the skin resistance before turning the current up to maximum. Burns are usually the result of the former. The patient should be encouraged to complain at once of any discomfort. Headaches, dizziness or profuse sweating are occasionally seen. In these cases the current should be decreased until the milliamperage is around twelve to fifteen hundred.

Contra-indications to the use of diathermy are abscess formation, empyema, active tuberculosis, or increasing toxaemia during resolution. With walled in pus, dia-

thermy will increase pain and may cause spread of the infection. The danger of hemorrhage must be guarded against in tuberculosis. In cases of increasing toxaemia any increase in blood supply will cause an increase in absorption of toxins, a condition not desired in these cases.

Until we have a better knowledge of the exact way in which high frequency currents act on the body tissues, we must be content with the subjective and objective relief of symptoms which we see in these cases and recommend diathermy on these results alone. Certainly it gives as much relief as does codeine or other opiates and is preferable to them because it does not have their depressant effect. If we judge by the symptomatic results, diathermy certainly makes for grateful patients. I have seen patients, cyanotic, grunting and semi-delirious before treatment, left asleep, breathing easily, with little or no cyanosis when the treatment was completed. If diathermy has no other claim to recommend it in pneumonia it certainly does add to the comfort of the patient. A comfortable patient is a patient who conserves his strength, who keeps quiet, who rests and sleeps. Diathermy checks that harassing cough which produces nothing and expends so much of the patient's energy.

A few days ago I went through the ward and asked each patient what he thought of the treatment. The answers were very similar. I will give you a few. One said: "It relieves my pain, I breathe easier, and I don't feel short of breath and I sleep better." Another said: "It makes me more comfortable and since I have been getting the plates on me, I sleep most of the time." A seven-year-old child said after a treatment the night before: "It makes me feel good and I slept last night."

Stewart claims a death rate of about twelve per cent in all cases treated. We have not been so fortunate, as in one hundred cases we have had almost double that mortality rate; twenty-one deaths, or twenty-one per cent. This death rate compares favorably with that of the three years immediately preceding the use of diathermy in pneumonia cases in this same hospital. The combined rate for the years 1923, '24 and '25, was 28.7 per cent. Of the twenty-one deaths, five were terminal pneumonias following other illnesses, as follows: One following tetanus, one in a case of diabetes mellitus, one in a carcinoma case, one in a psychopathic case, and one in a seventy-year-old general arterio sclerosis. Three others died on the day of admission and eight others within forty-eight hours after admission. These last eleven cases were brought in after several days of illness, their condition being almost hopeless upon admission to the hospital.

In conclusion, let me impress upon you that diathermy is a useful adjunct in the treatment of pneumonia and not a specific for all types or for any one type of pneumonia. Until we find a specific for pneumonia we must use all means at hand to combat the disease, and while diathermy is only one of these means, we have found it an important one in the following respects: First, it relieves pain; second, it relieves coughing; third, it promotes better aeration of the lungs and blood; fourth, it combats shock; fifth, it promotes sleep and rest.

Washington, D. C.

Infra Red in the Treatment of Myocitis

I. Lattman, M. D.

Though we know the wave length (64,000 to 6,500 Angstrom units to the red of the visible spectrum) we do not know the definite depth of the penetration of the infra red. The effect produced by it is local hyperemia, sweating and sense of warmth. This is suggestive of very superficial penetration. We know nothing of the effect of infra red on the blood picture. We do know, however, that it is of great benefit in the myocitidies (particularly in wry neck and the muscles around the shoulder girdle).

Relief of pain and relaxation follows one or two, or, at most, three treatments.

The patient reports with severe pain, stiffness of the neck, and limitation of motion of the neck or arm, as the case may be. As soon as the lamp is applied, the pain is lessened, and the patient feels much relieved. This is not the case when conductive heat is applied, as the electric pad, hot water bottle, etc.

After the first treatment the pain is usually relieved for a period varying from six to fourteen hours to complete relief. Stiffness gradually disappears. In those cases in which pain recurs, it is usually less and the stiffness is not so marked. The next day one more treatment is given, usually followed by complete relief. The treatments vary from twenty to thirty minutes with the infra-red lamp about 30 cm. directly over the painful area. In some cases it is necessary to give a third treatment. It is understood that bone pathology is to be ruled out by history, physical, x-ray and laboratory findings.

We have had many cases in the past few years, but I want to report only five cases, three of wry neck with severe pain and stiffness and two of severe shoulder girdle pain with limitation of motion, which were completely relieved of pain and stiffness in two or three treatments.

The same holds true of all our cases of wry neck and shoulder girdle pain, with the exception of two; where infra red was administered in the presence of metastasis.

Case 1—Male, white, 28 years. Has been perfectly well for last five years, went to bed well the night before. On arising patient found stiffness of the right neck, head drawn to the left, and severe pain on the least motion. Patient saw his physician, who advised Physical Therapy. After two treatments (with no other medication), the patient was completely relieved of pain and stiffness.

Case 2—Female, white, 24 years. Reported with stiffness of the neck and severe pain on the right side. Patient gives similar history as the one above. Two treatments were given followed by complete relief (no other treatment used).

Case 3—Female, colored, 38 years. Gives history of gradual oncoming pain and stiffness, of the right neck, for the past three days. On the third day the patient was unable to move head, and had severe pain. Patient reported to the clinic, and was sent to the Physical Therapy Department for treatment. In this case four treatments were necessary. Complete relief from pain and stiffness followed. No other medication used.

Case 4—Male, white, 60 years old (physician). Suddenly developed pain in the right shoulder and definite limitation of motion. Pain gradually increased, and limitation also increased. The patient came to the Physical Therapy Department for treatment, and this case three treatments were given, followed by complete relief from pain and freedom of motion. In this case some Aspirin in addition to the infra red treatment was used.

Case 5—Male, white, 45 pears. Physician. Gives history of gradual oncoming of pain and limitation of motion following an hour's play of tennis. The doctor resorted to some liniment medication and combination of Aspirin and Codeine, with no appreciable relief. Doctor reported to Physical Therapy for treatment and after three treatments was completely relieved of pain, and normal motion restored. During the three days of Infra Red treatment no other medication was used.

It is interesting to note that in all the above cases some relief followed the first treatment.

Garfield Hospital, Washington, D. C.

Physical Relations of the Physiotherapist and Patient

Extracts from an Address by Dr. Elwood Worcester of Emmanuel Church

In a Joint Meeting of Massachusetts Physiotherapy Association, Inc., and Amy Morris Homans Club of Boston, Apr. 9, 1929

Psychology applies to all departments of life and thought.

It might be quite safe to say that there have been only three great revolutionary discoveries in the whole history of human thought.

One would be reckoned the discovery of Copernicus and Galileo in regard to the revolution of the earth about the sun, and that the earth is a satellite of the sun. With that thought, not only were all man's ideas in regard to the physical universe changed, but a very large part of his theological and religious beliefs were changed.

The second of man's great revolutionary discoveries will undoubtedly be Evolution. It enabled him to know the history of the past, and the history of the human race, and the plausible theories in regard to the formation and the development of animal forms which he had been unable to know before. It was Evolution which has given us some knowledge of the past.

Third. The discoveries made during the last twenty-five or thirty years in the realm of psychology and particularly the subconscious elements in the human mind.

When we stand very near to a lofty mountain, it cannot look to us very different from the rest of the scenery. So it is in regard to the psychology of human nature. That, also, is a discovery which has changed our estimates of human life and human nature.

The difficulty has always been that there is hardly anything in this world that we knew less about than about ourselves. The discovery of the subconscious elements of our minds is a discovery of first class importance that has changed a great many things in this world, and is continuing to change a great many more.

I should like to be regarded as a co-laborer. The things that I might, perhaps, be able to convey to you that might possibly be of some value would be along the *human* side of your work. It makes no difference how good our physical technique is. If we are working with human folks, we must have something better than physical technique. If we want to succeed in our own work and to get the full benefit from that, we ought, as far as possible, to get in contact with the personalities, give our personality to our patient and receive spiritual confidence from the patient. The only way we can get the confidence of the patient is by being confident in ourselves.

There are people in this world, and not such a very small number of them, either, who might be called negative personalities because they are constantly detracting from other people. Instead of giving, they are taking. No one who is trying to do any valuable or important work can be a negative personality. These persons are so opinionated that their ideas are of no value, and one characteristic is rigidity. There is no way that I know of by which people ordinarily, and especially persons who are not very strong, invalids and nervous people, waste their vitality more constantly than by rigidity. We may try to educate them, and think we are making a good impression on them, but we find they are absorbing our vitality and so depressing us.

One of the most important things that we can teach people is to live on a low tension. When I see, as I often do, people of such different personalities who come to me to learn that simple lesson, I realize what a very important thing it is to live on a low tension, to avoid nervous and muscular rigidity, not to exert ourselves more than we are obliged to; to relax in what we are doing. If we live that way, almost all of us have strength to do the tasks that God has given us. But if we allow a large part of our energy to escape through the ends of our fingers in muscular tension, we have just so much less to turn to good effect. You know when you were learning to ride a bicycle, you held everything so rigid and so tight that if you saw an ice wagon approaching, it was all you could do not to run into it. If you HAVE YOUR NERVES UNDER SUCH CONTROL THAT YOU ARE RELAXED, you can do good work, but as soon as you become tense you fail.

There are ways of making people tense and nervous by our own expression. If we find we have that effect on other people, we ought to try to control that.

If we are calm and peaceful and enjoy life and the work we are doing, especially if we are doing it for God's sake, we can communicate it to the people we are with. There are instances in which relaxation is so important that persons might have died without it. A few years ago I was writing and touching on these subjects; that is, trying to relate some spiritual things with scientific things, when the telephone rang. A well-known physician called to ask me to visit a little girl in the eye and ear infirmary who had been operated on for double mastoiditis, and was in convulsions, vomiting, a condition resembling tetanus. I promised to go. I found this girl who had been a very lively child—twelve or thirteen years old—now looking like a little skeleton, hardly any flesh on her body at all, in awful convulsion, held on one side by the mother and on the other by the nurse. I asked the mother and the nurse if they would go to the back of the room. I took her by the hand, and told her a story about bears making dens in the winter time. They would make a deep bed of leaves in a cave and then lie down and go to sleep—sle-e-p—s-l-e-e-p and not wake up for a long time. By that time the child was almost asleep, and perfectly relaxed. I told her, "You will sleep about three hours, and when you wake up, ask mother to give you something to eat and she will do so." Then I told the mother and nurse that she would sleep about three hours, and wake and ask for something to eat, and to give her what seemed best. At about ten o'clock the child awoke, and called, "Muzzie, my stomach feels so good! I want a glass of milk and some crackers." She gave her those, and then some more crackers, and then the girl asked for some ginger ale. That was accomplished through relaxation.

Sleep. Apart from pain and fever, about the only thing that keeps us awake at night is too great activity of our minds, if worries, animosities and other affairs are in our minds.

Definition: Sleep is COMPLETE MENTAL INDIFFERENCE.

Therefore, it follows that the nearer we come to complete mental indifference, the nearer we are to sleep. It is always well for persons who suffer from insomnia not to engage in exciting discussions or to indulge in

exciting activities, and especially not to brood on their wrongs. We ought to know that sleep is probably the most important of the restorative agencies of nature. People will die sooner of complete insomnia than of lack of food. I would not say than of lack of water. There is no blessing I know of in this world as great as to sleep naturally without the use of drugs. People differ in the amount of sleep required. Napoleon Bonaparte slept only four hours, but he was only half awake at Waterloo, and slept most of the time after he got to St. Helena.

In sleep I feel certain that we touch something that we might call divine. There is in it a healing power that we can obtain in no other way.

Sleep consists of relaxation of our bodies and reconciliation of our minds. When our Savior taught all these wonderful truths concerning love, he was thinking more of the great harm animosity did to the hater than the hated. Sleep, in its power to mitigate pain, seems to me divine.

I think I have prepared at least five hundred persons for surgical operations. If a person can approach it without horror or undue fear, everything goes so much better. The worst part of a surgical operation is the after effect. If the surgeon should see the patient six months or a year later, and see what harm is done to the personality he might revise his opinion as to the effect of the operation. Patients should approach the operation without fear—without rebellion. Less ether is required in such cases.

A doctor sent for me to go to the Phillips House to see his patient who was to have an operation, saying, "She has had no sleep for a very long time. If she does not get sleep, I think she will not stand the operation. I was just starting for a trip, and said, "If it will be agreeable I will send Dr. McCoomb." He agreed, and Dr. McCoomb went. He asked all to leave the room where the patient was. He stayed in the room about five minutes, then came back and began to put on his coat. The doctor was much distressed because he had not helped, but Dr. McCoomb said, "When I left the patient she was almost asleep, and I suggest you go in and see how she is now." The doctor did so, and was astonished to find her sleeping quietly.

No one in this life can go very far without some spiritual help and as far as Christians are concerned, and, I believe, as far as physicians are concerned, there is only one way and that is the way of Christ. The simple rules of life that he laid down, and that is the law of love. "Bear ye one another's burdens and so fulfill the law of love." I understand by the law of love, taking advantage of every opportunity that comes to help others.

Question: "How can we live on a low tension?"

Answer: By practicing relaxation as follows:

Imagine that you are sitting on a comfortable chair. Close your eyes a few minutes. I would like you to put your thoughts on peace and rest and relaxation. I should like you to think of those things, and if you do, presently you are relaxed. I want that feeling to effect the muscles and joints, especially the big muscles of the neck. Now feel it going down the spine, the muscles relaxing in turn, now the hips, your tongue drops to the floor of your mouth. You are now letting your mind drift in the direction of rest and of peace and quietness. As you are not using your brain actively, the blood tends to leave it reducing pressure there. Your body is becoming limp. Your arms and limbs are becoming relaxed, as if it would be an effort to move. Your eyelids droop. They are closing—closing—closing. Now your body is perfectly still, making no exertion or effort, and your mind is passing into the same condition. Your thoughts are wondering. They are becoming vague and dim and distant and uncertain. You can let yourself go. You can float. You can fly. You can drift away into rest and peace. Your mind is becoming like the beautiful lake when the wind has ceased to blow and there is great calm. You go down into rest. Down into peace. Down into quietness. Down—down—down—down—down. And as you rest your vitality returns. All sense of fatigue and weariness passes from you. If you suffered pain, it is diminishing—going down—passing—passing—passing.

Discussion of the Treatment of Exhaustion by Physiotherapy

Mary Lee Castleman

Exhaustion of the mind or body—both closely allied in the resulting physical symptoms produced—causes an interruption in the normal function of the body, mainly in the digestion and assimilation of food.

Continued interruption of these processes, after continued exhaustion, frequently results in a condition which the recuperative powers, varying with the individual, fail to overcome.

Such condition presents for treatment (as the individuals are too exhausted to recuperate without treatment) symptoms of anemia, neuralgia, otherwise noted as inflamed nerves, or just painful nerves, chronic hives, acne, acidosis, the latter present in the majority of cases.

These patients, on medical examination, present no specific injury or organic symptoms. Usually their diet has already been so limited, in an effort to control the acidosis, that they cannot digest many foods necessary to a normally balanced diet for the normal body. Their nerves, I believe, are not only irritated from exhaustion, but from failure to receive their necessary food supply. In cases of hives, splotches follow the nerve short branches on the skin. The itching adds to the irritation.

Biologically, lactic acid in the body is oxidized to carbon dioxide for the use of the body. In exhaustion the oxygen has been overused by muscle or nerve action, leaving a deficiency for the oxidation, thus causing the acidity. This acidity is doubly irritating to the nervous system.

These patients cannot relax. They cannot recover without outside aid. Doctors prefer external application of treatment.

Like you, I have received many of these patients for treatment by Physiotherapy. The order often called for massage and graded exercises. This did not give results because the tissues were already too exhausted to admit of any form of exercise, even the lightest, as massage. Those who apparently improved at the time, later reported a return of the same condition.

Our desire to suceced in whatever work is required of us by our source of supply, the medical profession, and the continued demand for treatment of these cases by external application of treatment, as Physiotherapy, has led me to try, with consent of suggestions from the doctors, other available means.

(1) Sweating of the accumulated wastes and acidity, interrupting the normal function of the body, will also gain relaxation of the tissues. I prefer the cabinet bath; auto-condensation or indirect diathermy, local baking *(not heating)*, to a thorough sweat, hot packs to same point, hot salt tubs, being good, though not as efficient substitutes.

(2) Removal of sweat and grease immediately by warm shower or heated alcohol.

(3) Tonic ultra violet radiation. All skin burn and irritating doses should be avoided. I prefer direct rays for these cases, which means eight applications each treatment of one minute thirty seconds in grading the time each treatment. The zoning method of general ultra violet radiation is more troublesome but indicated in more acute cases and in cases more susceptible to acute sunburn.

(4) Complete rest immediately after treatment.

Massage and exercises should only be used after improvement has well started.

Washington, D. C.

Arthritis and Rheumatoid Conditions—Their Nature and Treatment

By Ralph Pemberton, M.D.

Published by Lea & Febiger, Philadelphia—cloth, pages 354, illustrated with 42 engravings and one colored plate.

This is a book which every Physiotherapist doing work in arthritis should read. The author is a member of the Council on Physical Therapy of the American Medical Association. In this book thirty-three pages are devoted to Physical Therapy which consider the influence and use of heat, forms of application of heat, the physiological influence of massage, the indications for use of massage, exercise, postural exercise, rest, diathermy, ultra-violet light, and the faradic current. The role of the intestine and colonic irrigation in arthritis are also considered in this volume. There are twenty-six pages on the influence of diet and the types of diet to be employed in this disease. The author has made a point to avoid undue emphasis upon any one phase of treatment, for he believes that only wide-angled vision can attain to anything more than sporadic results in any large group of cases.

Outline of X-Ray Diagnosis for Technicians

By Herman A. Osgood, M. D.

A good technician should be sufficiently familiar with the appearances of x-ray films to determine, first, whether the film is of diagnostic quality; second, whether it shows to best advantage the pathology for which the patient is being examined. A film of diagnostic quality is one in which the line and structure detail is clean cut and sharp, is of suitable radiographic density, and presents the minimum of distortion. The photographic effects of the x-rays on the film is a direct function of the quantity of radiation used measured by milliamperes, the time of exposure measured by seconds, and the distance between the target of the x-ray tube and the film. The two former vary directly—that is to say that doubling the milliamperes or time doubles the photographic effect on the film. The latter varies inversely with the square—that is to say that if the source of x-ray is twice as far away four times exposure must be given to produce the same effect; and conversely if the source of x-ray is twice as near only one-quarter of the exposure time is needed. When the object to be radiographed is placed upon the film two other factors enter into the equation. The first is the density of the tissues to be examined. The more dense a tissue is the more resistance it offers to the path of the rays and consequently a less effect is produced on the film. Bone and metal which are fairly dense as compared with soft tissues offer greater resistance to the path of the rays and show as a lighter (whiter) area on the film. Such areas are sometimes spoken of as radio-opaque or areas of increased density. Conversely air spaces, as for example the sinus cavities and the lung fields which offer less resistance to the passage of the rays appear as darker areas on the film and are spoken as radio-lucent or areas of diminished density.

It is essential that the rays shall have sufficient penetrating power to pass through the denser objects, otherwise with prolonged exposure no detail can be visualized within them. The penetrating power of the x-ray is governed by the voltage impressed on the tube as measured in kilovolts, or inches, or parallel spark gap. Under ordinary working conditions one inch of parallel spark gap is the equivalent of ten thousand volts. Where the voltage is sufficient to cause rays to penetrate the object the effect on the film is a direct function; namely, if the voltage is doubled the photographic effect is also doubled. The formula, therefore, can be expressed as follows: Milliamperes times Voltage times Time—divided by the square of the distance—equals "K." "K" is a constant which represents the "speed" of the film.

The image produced on the film when exposed to x-ray in this light must then be developed and the photographic effect, sometimes referred to as the radiographic density, is further modified by development. Thus if a film is developed too long the image is too black; if a film is developed a shorter time the image is too light. In order to eliminate as many variables as possible from the technique development is usually assumed to be a standard time—usually five minutes—at a standard temperature—usually 68° F (which is approximately average room temperature). With such a standard development if it is found that the high lights (air spaces) are too light we can assume insufficient exposure. If, however, the high lights are black, showing that the uncovered spaces of the film have received sufficient exposure and the detail within the denser part is not clear, we can then assume that the exposure was correct but the penetration was insufficient.

Developing solution should be reasonably fresh. It can be preserved in dark-colored bottles, or if allowed to stand in developing tanks it will keep from four to six weeks. Temperature plays an important part in development. If the temperature is as low as sixty-five degrees the developer will not function well. Whereas if above seventy the developer will act too rapidly and the gelatine emulsion on the film is very likely to melt. The function of the developer is to bring out or visualize the image which is produced on the film by the x-ray. When the image is of suitable radiographic density it can be removed from the developer and rinsed in water. It is then transferred to the hypo or fixing bath—which serves two purposes, first, the removal of the excess of silver salt emulsion not used in producing the image, and second, a hardening of the gelatine which prevents subsequent melting of the film, particularly in hot weather. The excess of hypo must be removed by washing in running water. This takes about half an hour in cold weather and ten to fifteen minutes in warm weather. The films then can be hung up to dry and subsequently can be examined. X-ray films are issued in two forms: 1. The regular or contrast film, which is highly inflammable and when dry should be handled with care and stored in a safe place and only in small quantities. 2. The so-called "Safety Film," which is not highly inflammable or explosive but will burn with difficulty. The latter film is approved by the National Board of Fire Underwriters for use in storage and under ordinary conditions. The first type, as previously stated, requires special precaution for storage and is now being rapidly replaced by the safety type. Radiographic density, therefore, is a function of the exposure and development modified to a certain extent by the character of the film. Sharpness of line and structure detail is accomplished by accurate centering of the ray through the parts to be examined, the use of a fine focus tube, particularly for bone grain detail, and making provisions for demobilization of the parts during the exposure. Distortions are produced by inaccurate centering of the rays, by movement of the part to be examined, and by variation from the normal position—whereby normal shadows are so distorted as to simulate the pathological. Such distortions of normal shadows are sometimes spoken of as "artifacts."

Before permitting a patient to leave the x-ray room one should make sure that the pathological area under consideration is well shown in the film, preferably in more than one position. In bones and joints it is customary to make two views. One directly antero-posterior and the other laterally at right angles. The placing of the part on the films should adhere strictly to these standard positions unless there is a definite reason for using some special position. Variations from these standard positions are often confusing to the person who is to interpret the film. Where it is impossible to obtain true antero-posterior and lateral views of the part, it is sometimes a great help to use stereoscopic films which, when carefully taken and examined in a suitable stereo-

scope, will give the appearance of three dimensions. The areas most commonly examined are the bones and joints, teeth, sinuses, chest, gall bladder, and urinary tract. The technician should be familiar with the normal appearance of these areas as seen in the film. Bones and joints are commonly examined for fractures, arthritic conditions, and some of the less common pathological lesions such as tuberculosis, syphilis, abnormalities of development, and new growths. The presence of a fracture line is usually sufficient to establish a diagnosis, but fracture lines should not be confused with epiphyseal lines, which sometimes persist into the twenties or with lines produced by overlying shadows. In some instances such as impacted fractures it is not always possible to demonstrate the fracture line. The diagnosis, therefore, can then be made by a break in the continuity at the site of fracture (this particularly applies to Green Stick Fractures in children) or by an abnormal relation of the part as in an impacted fracture of the lower end of the radius or of the hip. Arthritic changes are less easy to demonstrate. Acute infectious arthritis usually shows in its first stage as a swelling of the soft tissues and a widening of the joint space. Later there is a narrowing of the joint space due to erosion of the joint cartilage and atrophy in the bones adjacent to the joint. Still later the joint space may be obliterated and the bony margins of the joint involved. Hypertrophic arthritis usually appears as a sharpening of the margins of the joint with a tendency towards sharp projections or spur formation. Atrophic arthritis is characterized by a marked atrophy or diminution of lime salts in the parts of the bone adjacent to the joint. For a description of the less common lesions the student is referred to any textbook on x-ray interpretation.

The teeth are most commonly examined for evidence of abscesses or focal infection which may not be obvious to the dentist upon clinical examination. Since the area involved is small, sharpness of detail in the film with a minimum of distortion is essential. The pathological areas are identified by changes in the normal structures, by the localized destruction of bone, or production of scar bone.

Sinus films are of little diagnostic value unless the detail is sharp and free from distortion. It is customary to take an antero-posterior view, either in the nose chin or nose forehead (with angle board) position. Thereby the relative opacity of the pathological side can be compared with the normal. The frontal sinuses vary greatly in size on the two sides and the larger of the two will naturally offer less resistance to the passage of the ray and will, therefore, be more radiolucent. This must be taken into consideration in interpreting the film. The ethmoids and sphenoids do not show so marked a variation, and the antrums on both sides are usually of the same size and shape. The pathological sinus containing fluid, pus, or granulation tissue is usually more radio-opaque than the normal. A slight increase in radiographic density on the affected side may represent a chronic inflammatory thickening of the lining membrane. A very opaque antrum on the pathological side may indicate either fluid, pus, or granulation. It is essential in this connection to have enough of the history to make sure that the opacity of the suspected antrum is not due to normal granulation following a former radical operation. It is also of some value to note whether there is any deviation of the nasal septum and whether the shadows of the turbinates are within normal limits.

In examining the chest one should have a fairly light film such that the lung markings are not blacked out. A very black film in which only the heart shadow and the ribs are seen is of little diagnostic value. It is also important to have as little movement as possible and the technician should make sure that the patient holds his breath. The character and distribution of the lung markings in the film should be studied with reference to the interpreter's knowledge of the appearance of the normal. The hilus shadows on both sides should be noted as regards shadow distribution, extent of peribronchial markings, and the presence of enlarged glands should be observed. Pathological areas such as consolidation (pneumonia) and fluid or pus in the pleural cavity offer greater resistance to the passage of the rays and, therefore, appear as slighter areas on the film. It should be remembered in studying the character of the lung markings and the presence and distribution of the glands, that these changes may represent past as well as present history, and in cases of tuberculosis, particularly of the glands, it is not always possible for the interpreter to determine whether the condition is an old healed process or represents present activity.

The gastro-intestinal tract is visualized by the administration of a radio-opaque meal consisting of barium in a suitable vehicle, the latter usually being malted milk, butter milk, or certain other special preparations which can now be obtained.

The technician should make sure that only barium obtained from an x-ray supply house is used. Barium obtained from drug stores or chemical supply houses may contain poisonous impurities. It is customary therefore, to have the patient come to the office to obtain the barium to be used. Never write prescriptions for the patient to obtain it from his local druggist.

The study of the gastro-intestinal tract is made both by fluoroscopic examination and by films. Fluoroscopic examination gives an actual study of the motility and function of the organ during the process of digestion. The patient is examined in the standing position and the passage of the meal through the esophagus is noted. In studying the esophagus one should look for diverticuli, which usually occur near the middle, and constrictions due to cancer which may occur in the lower third. Cardiac spasm usually occurs at the lower orifice of the esophagus and may result in marked dilatation of the tube above. A normal stomach when empty shows a gas bubble under the left diaphragm and its walls below are collapsed and normally in contact. The stomach dilates as the meal passes in and the size of the normal stomach, therefore, will depend on the size of the barium meal administered. The fluoroscopist should first notice the position of the stomach—whether it is high and transverse or low and ptotic. High transverse stomachs are commonly associated with short stocky individuals, and low ptotic stomachs are commonly associated with tall thin individuals, but this does not always hold true. One should not confuse a stomach which is normally low in position with one which has "dropped" as a result of atony or loss of tone of the gastric musculature or dilatation due to obstruction. The lesions which are commonly visualized in the stomach by x-ray are ulcer and carcinoma. Ulcer usually appears on the lesser curvature as an area of induration over which the peristaltis waves do not pass. In active ulcer it is common to find an indentation or incisura representing a spasm on the great curvature opposite the ulcer. This should not be confused with the indentations of peristaltic waves which should normally move along towards the pylorus. A pyloric ulcer may produce a complete obstruction so that the stomach will not readily empty into the duodenum. A perforating ulcer will show a little mark or pocket extending out from the site of the ulcer. Old

indurated ulcers and carcinoma cannot always be distinguished by x-ray examination. All that the interpreter can report is to describe the lesion and suggest the possibility of carcinoma. Ulcer of the duodenum is fairly common and produces a deformity of the duodenal cap. The normal duodenum cap is smooth and rounded. An ulcer produces a defect on one side and usually opposite it there is a fixed incisura due to spasm, which produces a characteristic clover leaf deformity.

The stomach should be fairly well empty at the six-hour examination. At this time the bulk of the meal should be in the cecum and transverse colon.

The twenty-four hour examination should show the large bowel fairly well filled. The position of the cecum should be noted, whether high, low, or dilated. Kinks at either the hepatic flexure or splenic flexure should be studied for the possibility of adhesions. Adhesions should also be looked for about the tip of the cecum. These are best demonstrated by palpation under fluoroscope. The large bowel should normally be empty at the forty-eight hour examination. In cases of constipation a sizable residue may remain. The appendix is best seen at the twenty-four hour examination, but sometimes cannot be visualized until the cecum has emptied. An appendix which is normal should empty when the cecum has emptied and should not be tender on palpation. Fixation of the appendix by adhesions is usually readily demonstrated by fluoroscopic palpation. Constrictions or irregularities may indicate past inflammatory processes. Negative shadows may be produced by fecoliths or foreign material. The appendix findings, like the chest findings, may represent past history and may not necessarily be of present clinical importance. The most important signs, indicating active pathology, are local tenderness over the appendix, failure to empty and retention of barium in the appendix after the cecum has emptied. Redundancy of the loops of the large bowel particularly in the sigmoid area are not necessarily of importance unless there is delay in the emptying time.

The kidney outlines in the radiographs should be fairly distinct. Their size, shape, and position should be noted. Sometimes kidney outlines are obscured by gas in the overlying bowel and no interpretation can be made until after a second examination when the gas has been removed. Large stones are usually well seen when present in the kidney pelvis. Small stones in the kidney or ureter can readily be overlooked. Artifacts due to various causes are frequently misinterpreted as stone. In such cases duplicate films should be made, preferably with the cassette reversed or using another cassette.

Pathology in the kidney is not well demonstrated in the ordinary x-ray film. This type of lesion requires an injection of the kidney with an opaque salt—the resulting film being called a pyelogram. Dilatation of the kidney pelvis can be visualized by this means and also the size and shape of calices.

The outline of a thickened gall bladder can sometimes be seen in a plain x-ray film, and gall stones can occasioally be visualized as calcified bodies. Many gall stones, however, cannot be visualized this way. In such cases the gall bladder is examined after the administration of a dye which will be concentrated in the gall bladder. This gives the gall bladder outline and study of it can be made before and after the administration of a fat rich meal (which empties the gall bladder). Stones which were not previously seen can sometimes be seen as negative shadows when the gall bladder is filled or after the gall bladder has emptied because of a coating remaining from the dye. Negative gall bladder findings, however, do not rule out pathology or stone.

Examination of the spine is preferably done by the stereoscopic method and supplemented by a lateral profile view. When exceptionally sharp detail of a small area is required it is more satisfactory to use small films with a cone or diaphragm. The technician should carefully examine the films when developed and make sure that all of the vertebrae and the discs between them are sharply and distinctly seen. If there is any doubtful area further films should be taken until the maximum detail is obtained. Scoliosis of the spine may be functional or organic—the former due to posture or muscle weakness—the latter due to congenital defect such as triangular vertebrae. Tuberculosis of the spine is first evidenced by destruction of the discs between the two affected vertebrae and later by erosion of the adjacent margins of their bodies. Sometimes in the upper spine a fusiform swelling can be seen outlining a tubercular abscess. In the lower spine a bulging of the psoas muscle on one side is very suggestive of a psoas abscess when associated with the changes above described.

It is impossible, of course, in a brief outline such as this to give more than a general idea of what to look for in x-ray films. The technician should always see that sufficient films are taken to clearly demonstrate the pathology, but a great saving in expense can be made by the intelligent technician who will use the smaller sizes of films when sufficient to cover the area under consideration. A comparison of the price list of films will indicate that there is quite a difference in expense between the large films and the smaller sizes. While in many instances the technician may feel warranted in letting the patient go before films are developed it is usually wiser to have the doctor pass on the films as satisfactory and adequate before the patient leaves.

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EDITORIAL

Call to Convention

The eighth annual convention of the American Physiotherapy Association will be held in Portland, Ore., on July 8, 9, 10 and 11. Business of the association will be transacted, professional papers presented, hospitals and clinics visited, old acquaintances renewed, and lines of new laid in mutual interest and fellowship. Headquarters are at the Portland Masonic Temple. Delegates, members, friends, and visitors will find a hearty welcome.

PROGRAM

Monday, July 8

3:00-6:00 p. m.: Registration and Informal tea at Portland Masonic Temple.

8:00 p. m.: 1. Address of Welcome by Dr. C. Elmer Carlson.
2. "The Role of Physiotherapy in the Practice of Medicine" by Dr. H. M. F. Behneman.
3. "The Physiological Effects of Radiant Energy on Animal and Plant Tissue" by Dr. Chas. Sheard.

Tuesday, July 9

9:00 a. m.: Business Session.

12:00 noon: Officers' Conference and Luncheon.

2:00 p. m.: Physiotherapy Clinic Shriner's Hospital for Crippled Childern.
1. "Scholiosis" by Dr. Leo S. Lucas.
2. "Exercises for Scoliosis" Demonstration by Dorothea Sorenson.
3. Pool Demonstration by Susan Roen.
4. "Sinusoidal for Spastic and Flaccid Paralysis" by Dr. Arthur C. Jones.

8:00 p. m. 1. "Body Mechanics" by Sarah R. Davis.
2. Physiotherapy of the Cortically Rigid" by Steele F. Stewart. (Paper to be presented by Vernon P. Thompson).
3. "After Care of Spastic Children" by Lillie Tucker.

Wednesday, July 10

9:00 a. m.: Educational Program (Miss Irvine in charge). Speakers to be announced later.

2:00 p. m.: 1. "Practical Operative Technics in Certain Electrical Treatments" by Martha Hindman.
2. "Localized Exercises for Segmental Control Following Spinal Fusion for Scoliosis" by Susan Roen.
3. "Restoring Function to Muscles, Joints and Bones" by Dr. H. W. Chappel.
4. "Posture" by Olive Robinson.
5. "Open Discussion Concerning Equipment and Efficient Management of Physical Therapy Office Department Handling Ambulant Industrial Cases" by Dr. J. T. Watkins.

7:30 p. m.: Banquet at Sign of the Rose Tea Room.

Thursday, July 11

9:00 a. m. Physiotherapy Clinic, Oregon State Industrial Accident Commission by Dr. C. R. McClure.

10:30: Posture Clinic, Helen Phillips.

2:00 p. m.: Visit U. S. Veterans Hospital and Doernbecher Children's Hospital.

Physiotherapy Legislation

Legislation to establish a recognized standard of Physiotherapy is asubject of interest to us all and especially to those of us who live in states where there is no adequate law of registration. We of the District of Columbia have been particularly interested during the past year owing to the sponsoring of the Medical Society of the district of a bill "to regulate the practice of the healing art. "The various vicissitudes of this bill and its effect on us might be of interest and help to chapters in other states who are contemplating legislation of their own or who are affected by a bill such as the above mentioned.

Until the passing of this bill it had been possible for anyone to hang out a shingle and attach any name or degree he or she chose. I do not know if it is true in other states but in the District of Columbia everywhere one turns, the sign, "Chiropractor and Physiotherapist," is in evidence. Owing to this fact, very unfavorable publicity was given to us last year, because of the death of a girl from a fractured vertebra received while under treatment by a chiropractor. The papers blazoned forth headlines stating this girl's death occurred while she was being given "adjustments" by a Physiotherapist. The chiropractors evidently had so much influence with the press that the title chiropractor was not used in any report of the case, from the beginning until the time of his conviction, but the title Physiotherapist was freely accorded him. This was done despite the fact that we had published in all the papers a signed statement from the local chapter that this man was not an accredited member of our organization nor a graduate from an accredited school of Physiotherapy, and also a statement of the requirements of our organization and the specific work we do.

About this same time Miss Pearl McCall, assistant district attorney, was waging a valiant war against the

many pseudo schools and "diploma mills" which were flourishing in the district. In this connection it is interesting to note that the same week I, as local president at that time, received a letter from the superintendent of a state hospital in Pennsylvania asking for the standing of the Washington School of Physiotherapy, as they were considering an applicant from that school for a position in their P. T. department. Having never heard of the school, I got in touch with Miss McCall's office and learned that this was one of the diploma mills or at least a school that had never been accredited or recognized by anyone.

The medical Society's bill was introduced into Congress by Dr. Royal Copeland, senator from New York, Mar. 6, 1928. Again the chiropractors' influence "on the Hill," as we refer to the Capitol, was so strong that the bill was mutilated almost beyond recognition and Dr. Copeland said it was hardly worth the passing. After many arguments it was dropped in that first session, and then at the end of the last session of the 70th Congress it was revived and passed almost at the last minute, Feb. 27, 1929. During this time we had a very able representative in the person of Mrs. Winkler, (Gertrude Hatch) doing all she could to get us a recognized position in the bill.

This bill provides specifically for boards of examiners for the licensing of doctors, osteopaths, chiropractors, naturopaths and midwives and for such other boards as will be deemed necessary but does not definitely apply to the licensing or registration of Physiotherapists.

Section 43 says, "The provisions of this act shall not be contrued to apply to, (a).....; (b) to the practice of massage, or dietetics, or the use of hygienic measures, for the relief of disease or to the practice of any other forms of Physiotheraphy for the relief of diesase, or to the practice of X-ray or laboratory technicians, under the direction of a person licensed to practice the healing art in the District of Columbia." Another section raises the question as to whether we should register or not. The present ruling from the district health officer, who is secretary of the commission, is that we are not obliged to do anything. He suggests that, for our own protection and to prevent the indescriminate use of the word Physiotherapy, we apply for a licensing board of our own which, under the present act, can be done on the petition of five or more members. This would prevent the chiropractors becoming licensed as physiotherapists unless they passed the requirements of our own board. The health officer told me that the majority of them were filing their applications for licenses as chiropractor and Physiotherapist but they cannot receive any such license under the existing regulations.

It seems to me that we now have an opportunity to get on an accredited basis by putting before the commission our national organization standard as the standard for the Physiotherapists in the District of Columbia. It is a vital question not only locally with us, but nationally. Next year I hope we can give you a story of good results from this struggle; meanwhile what have other chapters to tell us. M. H. D.

The needs of Physiotherapy are so great that it seems difficult to know where to begin to solve our problems.

Perhaps as time for the convention draws near and we all meet to discuss ways, means, and problems, it would not be out of place to place them in the limelight.

First of all, we still feel the need of a name. There is so much in a name that it behooves us to come to some decision. Since the medical profession wishes to use the term, "Physiotherapist," I should say it is up to us to use some other word. It seems only right to choose one and only one word and all stick together in using it. Perhaps the coming of a new word is what we want as all the words in use now, which might be applied, are so used or misused that they do not meet our special position. Let us appoint each member of every chapter a commitee of one to use all their spare time in coining just such a word.

Second, the need of higher education and standards with more schools giving courses which would enable their graduates to meet these higher requirements is an ever-present problem.

Third, the need of more proper legislation to keep the work in the hands of the qualified worker is a problem each chapter must fact sooner or later.

Fourth, the need of more specialists in Physiotherapy is one the medical profession must meet to help us fulfill our pipe dreams of a place for Physiotherapy in the skies. The doctors woh are working in this field are the best to be had and are our best friends. So our only wish is for more men like them to enter the field.

So to the convention let us go, and although we cannot all be there in person, I am sure we will all be there in spirit. We will send our delegates and trust them to catch the spirit of the Portland Convention and bring it home to us. F. B. M.

Nature abhors a vacuum. The specialist has arrived, but he does not completely fill the place left vacant by the family physician. He used to heal hearts and minds as well as bodies. The much sought-after busy specialist cannot afford to give much time to the outpourings of the real or imagined troubles the patient is enduring.

Who falls so naturally into this vacancy as the Physitherapist. She needs must know the physician's diagnosis in order to give her treatment; she hears the patient's reports of the illness or injury and sees the present condition; she it is to whom the patient looks for advice on innumerable subjects from bathing and eating, to exercise and rest. In listening to the outpourings of the patient's woes, what is she to do about it? "Pass by on the other side," or is she to be the good Samaritan and do what she is able to, psychologically as well as physically?

If our Physiotherapist is to qualify for this post she must have more than a fundamental training in physical education or nursing. She must be more than a trained technician in this modality and that. She must have the personality that desires to be of service to her fellow beings, one who practices the golden rule not merely theorizes about it. She must strive to attain to the Christ-like personality.

Should we as a group keep this ideal before ourselves and our members we would be helping to fill a place left sadly vacant with the passing of the old time "friend," and possibly helping to bring peace and good-will on earth. C. M. E.

The Northern California Chapter of the American Physiotherapy Association wishes through the REVIEW and the director of the bureau of appointments to extend the courtesy of registration in its local bureau to all members of the national association.

This bureau may be addressed c/o The California Medical Association, 1016 Balboa Building, San Francisco, Calif.

Please send credentials and references with statements of active membership in the American Physiotherapy Association when making application.

The Study of Physiotherapy as a Vocation

By Lucile R. Grunewald

Editor's note: This is the final installment of Miss Grunewald's thesis, "The Study of Physiotherapy as a Vocation." The former installments have appeared in the October and December, 1928, and February and April, 1929, numbers of the REVIEW. It will be available in reprint form at the convention in Portland, Ore.

CHAPTER VII

SUMMARY AND GENERAL CONCLUSIONS

I. Summary and conclusions based on Objective I:

To determine whether the demand for Physiotherapy is sufficient to classify it as a distant vocation.

1. Physiotherapists feel that the medical profession is becoming interested and is beginning to recognize the value of Physiotherapy.

2. The public is becoming conscious of the value of Physiotherapy and is demanding it.

3. Hospitals are adding Physiotherapy departments or enlarging them.

4. Insurance companies and industrial plants are recognizing the economic value of Physiotherapy. It has been proven to them that it shortens the period of disability.

5. The crippled children movement in various states and counties, in Shrine organizations and also in city service clubs, has brought about a demand for Physiotherapy measures.

6. The demand for Physiotherapists seems far greater than the supply. In the last two years, two schools of physical education organized major courses in Physiotherapy; in 1927 New York University introduced a four-year degree course in Physiotherapy and the United States Army offered to physical education graduates a six months' training course in Physiotherapy aide training.

II. Summary and conclusion based on Objective II:

To determine the need of standardization of the practice in and the training of Physiotherapy.

1. Well-trained Physiotherapists feel strongly the need of standardization of training in Physiotherapy in order to gain the recognition and respect of the medical profession and to protect themselves, their profession, and the public from pseudo-practice of Physiotherapy.

2. Many states have no legislation on the licensing of the practice of Physiotherapy, thus giving Physiotherapy no recognition as a profession.

3. In states where there is legislation, there are too wide differences in requirements of training.

4. Some states require applicants for certification to be graduates of standardized schools of Physiotherapy. It is difficult to find standardized schools.

5. There are too wide differences in the entrance requirements of schools of Physiotherapy to allow for standardization. Some schools require only two years' high school education or its equivalent; some, high school education; others, graduate nurses' training or physical education training and others, general college training.

6. There are too wide differences in the length and content of courses of study in schools of Physiotherapy to allow for standardization. Some courses are six months long; others, a year, two years, and even four years in length. Content must necessarily vary with the length of course.

7. Civil service commissions have too wide a variation in the educational requirements of their applicants to allow for standardization.

8. If Physiotherapists are given as much responsibility as we find they are carrying now, there should be a more thorough educational background and training. High standards are needed.

9. Standardization seems best brought about by state legislation demanding high standards in schools of Physiotherapy. In May, 1926, New York State raised its requirements to four years of training beyond the high school, and consequently in September, 1927, New York University offered a four-year degree course to meet this state requirement.

III. Summary and conclusions based on Objective III:

To determine where the training in Physiotherapy can best be offered and the length and contents of a suitable course.

1. Physiotherapists feel that the training in Physiotherapy can best be offered in a physical education school or department of physical education in a university, both of which give an opportunity for specialization, or in a university which offers a Physiotherapy major in a four-year degree course.

2. The length of the course should be at least four years as indicated by the Physiotherapists, by their salaries, by their tenure of office and by the age requirement of the civil service commission. It should also be long enough to allow for some liberal courses in literature and social sciences which may fit Physiotherapists for a fuller and richer life.

3. The course of study should be so arranged as to allow a logical sequence of courses.

4. The curriculum must include a thorough course in anatomy, applied anatomy and physiology, and comprehensive courses in the theory and practice of all branches of Physiotherapy.

IV. Summary and Conclusions on Objective IV:

To suggest legislation determining the requirements for licensing the practice of Physiotherapy.

1. By legislation, Physiotherapy can be standardized and made a distinct vocation. This will raise the status of the vocation of Physiotherapy to a more professional plane.

2. State certification serves as a protection to well trained Physiotherapists and to the public.

V. General Conclusions:

1. There is an increasing demand for Physiotherapy which justifies classifying it as a distinct vocation.

2. There is a definite need of the standardization of the practice in and the training for Physiotherapy.

3. A suitable curriculum in Physiotherapy can best be offered in a university in a four-year degree course with its major subjects, anatomy, physiology, physiology of exercise, electro-therapy, massage, muscle training, orthopedics and therapeutic exercise.

4. There is an urgent need for state lgislation in the practice of Physiotherapy.

CHAPTER VIII

BIBLIOGRAPHY

Bettman, R. B., "Physiotherapy Brings Relief to Many Types of Cases." *The Nation's Health,* 829-932: December, 1924.

Drew, Lillian C., "The Training of Physiotherapy Aides." *Mary Hemenway Alumnæ Association Graduate Department of Hygiene and Physical Education, Wellesley College Bulletin,* 11-14: 1918-1919.

Kessler, Henry H., "Physiotherapy and Rehabilitation of the Physically Handicapped." *The Physiotherapy Review,* 25-28: September, 1927.

King, Helen, "The Value of Physiotherapy in a School for Children of Pre-School Age." *Mary Hemenway Alumnæ Association Bulletin,* 22-24: March, 1927.

Lowman, Charles L., "Present Day Problems in Physical Education." *American Physical Education Review,* 313-317: October, 1921.

Lowman, Charles L., "The Gymnast in Medical and Surgical Practice (An Angle of the Physiotherapeutic Problem)." *American Physical Education Review,* 368-373: November, 1921.

McKenzie, R. Tait, "The Treatment of Nerve, Muscle and Joint Injuries in Soldiers by Physical Means." *American Physical Education Review,* 355-360: June, 1918.

McKenzie, R. Tait, *Reclaiming the Maimed,* (A handbook of Physical Therapy), The Macmillan Co., New York, 1918.

McMillan, Mary, *Massage and Therapeutic Exercise,* 2nd ed., 1925, W. B. Saunders Company, Philadelphia.

McMillan, Mary, "The Physiotherapists." *Mary Hemenway Alumnæ Association Bulletin,* 19-22: March, 1927.

Palmer, Charles A., "Remedial Reeducation Overseas." *American Physical Education Review,* 371-375: June, 1918.

Sanderson, Marguerite, "Woman's Part in the Work of Reconstruction." *American Physical Education Review,* 367-370: June, 1918.

Stewart, Harry Eaton, "Educational Requirements of the Present and Future in Physiotherapy." *The Physiotherapy Review,* 3-5: September, 1927.

Stewart, Harry Eaton, *Physiotherapy,* Paul B. Hoeber, Inc., New York, 1925.

Stewart, Harry Eaton, *Physical Reconstruction and Orthopedics,* Paul B. Hoeber, Inc., New York, 1919.

Stewart, Harry Eaton, "The Treatment of Muscle Injuries in Athletes." *American Physical Education Review,* 259-261: May, 1925.

Stewart, Isabel M., "Educating Nurses." *The Survey,* 537-538 and 568-570: Aug. 15-Sept. 15, 1927.

Sweney, Miriam T., "Reconstruction Work on Returned Soldiers." *American Physical Education Review,* 376-380: June, 1918.

Titus, Norman E., "Physiotherapy Shortens Recovery Period after Injury." *The Nation's Health,* 456-459: July, 1926.

Wellington, Emily, "Physiotherapy in General Hospital Practice." *The Physiotherapy Review,* 8-12: September, 1927.

Bulletins and Circulars

Circular of Information School of Massage, Electricity and Allied Branches. Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases, October, 1927.

Department of Legislation and Education. *State of Illinois Medical Practice Act.* Senate Bill No. 439, Springfield, 1927.

Department of Public Instruction State Board of Medical Education and Licensure, Harrisburg, Pa. *Rules and Information. Physiotherapy.*

Directory of Graduates of Osteopathic Schools Holding Physicians' and Surgeons' Licenses, Osteopathic Licenses, Drugless Practitioner Licenses. Published by the Board of Osteopathic Examiners, Mar. 3, 1927. California State Printing Office. This includes the Osteopathic Act of California.

Los Angeles County Civil Service Commission, Vol. 15, No. 133, Oct. 5, 1927.

Prospectus of the Hospital Training Course in Physiotherapy for Aides. Army Medical Center, Walter Reed General Hospital.

State of Wisconsin—*Reprint from Legislative Act,* 425A, Chapter 482, Laws of 1919.

The New Haven School of Physiotherapy Bulletin—Ninth year, 1927-1928.

The State Medical Practice Act of California, amended to May 14, 1925. California State Printing Office.

United States Civil Service Examinations—Physiotherapy Aide—Physiotherapy Pupil Aide. No. 30 (assembled) c 39. Issued Jan. 10, 1928.

University of Oregon Bulletin. *The Lasting Appeal of a Liberal Education.* New Series, Vol. 23, No. 4. April, 1926.

University of the State of New York. Handbook 9—Higher Education—Medicine (including Osteopathy, Physiotherapy). *Laws, Rules and Information,* June 1927.

University Bulletins: University of California, University of Illinois, University of Iowa, University of Michigan, University of Oregon, University of Washington, University of Wisconsin, Boston University, Teachers College, Columbia University, Yale School of Nursing.

Abstracts

John S. Coulter, M. D.

On Some Aspects of the Physiology of Muscular Exercise. By A. V. Bock, M.D., in N. E. J. of M., 200: 13:638-642: March 28, 1929.

Starting with the lungs, exercise apparently increases the vital capacity of the lungs, resulting in a greater pulmonary diffusion area. The larger stroke volume of the heart, together with the slow pluse rate, insure competent circulation of blood. . . . As work increases, oxygen utilization increases until, in a trained subject, the level of oxygen in the mixed venous blood reaches a point below which it does not fall. . . .

The study of our four subjects indicates that physical training increases the lung capacity, induces a slow pulse rate, increases the stroke volume of the heart, reduces systemic blood pressure during work, and apparently greatly increases the oxidation capacity of the muscle cells. . . .

From a clinical point of view it is now feasible to obtain quantitative data with reference to the physical reserve of various types of patients. There are many patients who have, or think they have, cardiac disease, whose lives are handicapped because of uncertainty in the event of exercise. It is possible to make certain quantitative observations of a helpful nature in this type of problem. Changes occurring during convalescence can be followed until a normal state is reached. The ability of a given patient to take exercise can be measured. The results of a system of graduated exercises in a given case can be tabulated and used by the patient as a score card of progress.

Exercise, or the want of it, is responsible for many obvious adaptations, obvious once they are appreciated. Exercise for exercise's sake, however, is not to be recommended in a haphazard fashion. An hour of exercise added to the schedule of an already fatigued business man might well be disastrous to him.

Bathing and Hydrotherapy in Heart Disease. The Medical Standard. 52:1:18: January, 1929.

Milton J. Raisbeck, M.D., in the Long Island Medical Journal, believes that for cleansing purposes the best form of bath for cardiac patients is a sponge bath in 6 or 8 inches of tepid-warm water. Avoid extremely hot or cold water and avoid immersion in a full tub unless the bath is destined for therapeutic purposes, with an assistant at hand. Long habits may to a certain extent be respected, especially in regard to cold showers; they have a tonic vaso-motor effect if well borne as the result of habit. When the blood pressure is low, water too warm may cause an unfavorable effect and cool temperatures are desirable; in high blood pressure and anginal cases, cold water may be dangerous. Turkish or Russian baths should be forbidden absolutely.

Hydrotherapy in cardiac disease has reached a greater degree of popularity in Germany than in this country. The question is a complex one. It is certain that the benefits secured at Nauheim are due to many other factors besides the baths. As the result of my own experience I have come to believe that Nauheim baths are helpful in proportion to the nervous elements present. They assist in stabilizing the circulation in effort syndrome and in other cases where nervous tension is a disturbing factor. In organic heart disease they appear to hasten convalescence occasionally, but their mode of action remains obscure. I place no credence in the statements that after a single bath or even after a series of baths the heart has decreased in size one or two centimeters, a feature in many clinical reports from Nauheim.

These baths require a certain amount of effort and cannot be used to advantage unless the patient has been able to begin exercise without producing symptoms. They are contra-indicated if any signs of heart failure are present and in a sense represent a form of after treatment, useful after some degree of cardiac reserve force has been recuperated.

A course of effervescent baths may be given at home by the use of Triton bath salts; the only other ingredient required is ordinary table or rock salt. The bottom of the tub should be protected by rubber sheeting to prevent any deleterious action of the acid salts on the enamel. A bath thermometer is needed to control, the temperature, preferably of large size (16 inches long). A course of baths is given as follows:

First bath: temperature 98 degrees; time 5 to 7 minutes; five pounds of ordinary salt for the average bath tub holding 50 gallons of water.

Second and third baths: same temperature and composition; time increased to 10 minutes.

Subsequent baths: For each one add an additional pound of salt, lower the temperature 1 to 2 degrees and increase the time 2 minutes, so that the last of a series of 10 or 12 will have a salt content of 15 pounds, a temperature of 80 to 84 degrees, and a duration of 20 to 25 and even 30 minutes.

At first the patient will feel a sense of oppression over the chest and the desire to breathe deeply, possibly gasping for breath for a moment. These symptoms may be disregarded as long as there is no marked cyanosis, excitement or weakness. Breathing becomes easier as soon as the patient relaxes. As the bubbles of CO^2 accumulate over the body the skin becomes pink, with a grateful sensation of warmth. After the bath the patient should be dried by light tapping, not rubbing, with a heavy towel and should slip between light blankets for a rest of 2 hours in a darkened room, free from noise and disturbance.

It is usual to give a bath daily for three days, skip a day and then take three in succession again; thereafter for the last four to six baths of a series, one may be given every second day or three times a week. A bath should not be given within an hour of a light meal or within two hours of a heavy one. Throughout the series the reaction of the patient determines the details of the program. The reaction may be poor if the temperature is lowered below a certain degree or if immersion is prolonged beyond 10 or 15 minutes. A very few react badly; chill, cyanosis, dyspnea or nervous excitement indicate that the baths are unsuitable.

Diathermy. A Critique and an Experimental Study, by Leo E. Pariseau, M.A., Radiologist, Hotel Dieu, Montreal, in The Can. M. A. J., xx:2:151-2: February, 1929.

Our experiments were conducted with electrodes of

different sizes and shapes, in shallow dishes of the emulsion or on large blocks of the jelly, at several frequencies, with widely variable time, intensity and ohmic resistance factors. Attempts were made to mimic body conditions by working on "layer cakes" composed of wet chamois leather, petrol-agar emulsion, and water-agar. It soon became evident that all this constituted a very crude approximation because it disregarded one great factor of heat distribution ever present during therapeutic applications, namely, the blood stream. On that account, the possibility of establishing an artificial circulatory system by means of saline solution passed through coils of macaroni was investigated with encouraging results.

It is quite evident that such experiments had better be reported in periodicals dedicated to physiotherapy or bio-physics. However, those who have waded through our article in the hope of discovering some useful truth will expect a few general conclusions concerning the value and shortcomings of diathermy. The following are offered:

Diathermy is not a misnomer. Currents of the frequency used in medical practice do not flow over the surface of colloid-saline masses; they go right through, and they are capable of heating all through.

The path followed by such high frequency currents is very similar to that which would be followed by unidirectional or low-frequency currents.

"Skin effect" need not be a bugbear or a deterrent. Experiments made with hollowed-out bologna sausages or cylinders of salt solution may tend to show that skin effect is quite noticeable during diathermy, but such experiments are fallacious because they are based on meter readings and because the test object is altered in the course of the experiment. When the test-object is left untouched and the doings of the current judged by the appearance and distribution of heat, skin effect seems a negligible factor.

Superficial hot spots and "edge effects" are manifestations of an uneven electrical field rather than of poor contact or sharp edges. More attention should be paid to the relative size and position of the plates in each particular instance.

"Maximum heat at the center" is a misleading slogan. In a homogeneous, unobstructed and unconstricted electrical field, the greatest heating effect is always to be found near the electrodes and not half way between them.

Internal hot spots or islands are, however, theoretically possible in certain cases, for instance, when a bone or an intestinal loop filled with gas occupies a relatively large portion of the diathermic field.

The blood stream tends to nullify the deeper local effects of diathermic currents, but the interaction of both superficial and deep circulation with the heat regulating centers of the body could easily reverse the heat gradient observed in some of our experiments. When and within what time this occurs is a question that cannot be solved by "in-vitro" investigators.

Diathermy in Gonococcal—Infections of the Female. By Winifield Scott Pugh, B.S., M.D., New York City in J. Med. Soc., New Jersey, 26:3:227: March, 1929.

In his summary this author says:

In diathermy we have an ideal method for the treatment of gonorrheal infections of the urethral and cervical canal with its complications.

All treatment is conducted by the physician so that he is in contact at all times. It must, however, never be intrusted to a so-called technician.

Provided one is willing to keep within bounds, it is painless and the procedure not complicated.

It protects the patient, as she does not have to keep medicines or douche bags about her room.

Our observations, and those of others, show at least 70 per cent of cures, which is certainly excellent.

This report is based on 500 cases, not only in our own, but from several of the largest services in the United States.

Physiotherapy and the Insured. Editorial in Brit. J. Actionotherapy 3:11:211: February, 1929.

Physical treatment is of grea[t] value at some stage in almost every type of chronic arthritis. No scheme for treatment for chronic arthritis can be considered complete unless a large range of physical methods under skilled direction is provided. There is an urgent and rapidly increasing demand for physical treatment, which demand already far exceeds the provision, and which may increase very rapidly in the future as the education of the public in the value of such treatment progresses. The most important forms of physical treatment for chronic arthritis are electrical treatment, including diathermy, radiant heat and ionization, massage and exercises, and the various forms of hydrological treatment.

These words provide an excellent text for the following observations. They are not our own words, but appear in Dr. J. Alison Glover's Report on Chronic Arthritis to the Ministry of Health, issued with a preparatory note by Sir George Newman.

The cause or causes of chronic rheumatic complaints are very obscure, but it is undeniable that physiotherapy in its widest sense holds out at present the greatest prospects of benefit.

Influence of Quartz Lamp Irradiation on Quantity of Milk in Nursing Mothers. By Drossel in Deut. med. Wchnschr., 55:62: Jan. 11, 1929; abst. in Jour. A. M. A., 92:10:850: Mar. 9, 1929.

The presumption that quartz lamp irradiation increases the quantity of milk in nursing mothers was tested by Drossel on fifteen women. The treatments were given as follows: Five minute irradiations, at a distance of 80 cm., were gradually increased to from seven to eight minutes and later to 20 minutes. At first the treatments were given every other day; later only once or twice a week. The total number of irradiations during the first three or four weeks were usually 12 to 14. Later the women were given one or two treatments a week, each irradiation lasting 30 minutes. The author observed positive results only in those cases in which the treatments were started during the first week following the birth of the child. He doubts, however, that this is the effect of the irradiation, because during this time the quantity of milk normally increases. In four instances he even noticed a decrease. No extraordinary increase was observed in any of the cases. *Drossel concludes that his experience does not substantiate the claims made by others that quartz lamp irradiation increases the secretion of milk in nursing mothers.*

Asthma and Radiation. An editorial in Actinic Prac. & Electrotherapist 1:5:64: February, 1929.

Sufferers from that very distressing trouble, asthma,

have been with reason inclined to complain that very little can be done to alleviate their condition. It is therefore encouraging to learn from a paper in the British Medical Journal by Dr. Gilbert Scott, of the London Hospital, that its treatment by radiation is on the whole giving satisfactory results. The true therapeutic value of this method, says Dr. Scott, cannot, of course, be gauged until a far larger number of cases have been treated, but at all events it would appear that in radiation there is to hand at least a valuable palliative agent. Asthma, it is generally accepted, is not a lung disease, but some condition outside the lung is probably responsible for the bronchial spasms. Dr. Scott puts forward the theory that possibly asthma the secretion of the supra-renal glands is defective. He is of opinion that in some manner, general irradiation influences the secretion of the ductless glands. In other words, the beneficial results may be obtained by restoring the metabolic balance.

Some Newer Aspects of Rickets. By T. M. Barber, M.D., Charleston, W. Va., in West Va. M. J., 25:4:200: April, 1929.

Sunlight should be explained to the parents; it should be started, when the weather permits, at about three weeks of age, and continued daily thereafter. First expose the hands and face 10 to 15 minutes a day, increasing the length of exposure two or three minutes a day. As tan forms, expose the legs and arms; later, the whole body, until a limit of one hour's exposure twice a day is reached. Remember that dust, clouds, smoke and moisture cut off the short ultraviolet rays, and that sun exposure cannot be accurately judged for these reasons. Ordinary daylight has some anti-rachitic value; about half to two thirds that of the sun. The attempt to use special glass, permeable to the ultraviolet of the sun, is successful but expensive and is hardly practicable for the average person.

Mercury vapor quartz lamp is an excellent preventative and curative agent, and the dose can be accurately judged. Exposure should be over the whole body, front and back, at an 18-inch distance, for two minutes, three times a week, gradually increasing the length of exposure to 10 or 15 minutes. This lamp does all that sunlight can accomplish, and is to be preferred to carbon arc and other lamps for this purpose.

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*The Effect of Ultraviolet Rays on the Capillary Blood in Active Rickets.** By Abraham S. Small, M.D., in N. E. J. of M., 200:10:485-487: Mar. 7, 1929.

*From the Department of Pediatrics of the Harvard Medical School, and the Infants and Children's Hospitals, Boston. This study was made possible by a grant from the Proctor Fund, for the study of chronic disease.

In his Summary and Conclusions the author says: "Fourteen cases of active rickets with associated anaemia were studied with the view of observing the effects of ultraviolet rays on the anaemia.

"It will be seen by a review of the cases that there is very little improvement as regards the anaemia. In fact, there is very little measureable change in any of the blood components studied, excepting that in several cases there seems to be evidence of an increase in lymphocytes. In practically all cases, however, excepting those treated by Vitaglass, and ordinary window, there is evidence of healing or healed rickets.

"We conclude from these observations that ultraviolet rays, employed in the treatment of rickets, have practically no beneficial effect on the associated anaemia."

The Carbon Arc Versus Sunlight. In Miscellany Section of Journal A. M. A., 92:10:836: Mar. 9, 1920.

Letter circular LC-225 of Mar. 5, 1927, summarized "Some Outstanding Accomplishments of the Bureau of Standards in 1926," including a summary of a research on the radiation emitted by the carbon arc lamp, in which it is stated that, "of all the artificial illuminants tested, the carbon arc is the nearest approach to sunlight in spectral energy distribution." Unfortunately this whole caption is being used in the advertising literature with the inevitable result of an increased demand for this letter circular, which is now out of print. It has therefore been found desirable to publish a further statement on this subject, which is given in Technical News Bulletin 140, of the Bureau of Standards, Department of Commerce, December, 1928.

First of all, it is to be emphasized that no artificial source of radiation has yet been found which has a spectral energy distribution exactly like that of sunlight. Of all the sources examined, the spectral energy of the carbon arc is the closest approach to sunlight; but even this is not an exact match of sunlight in spectral intensity. It contains ultraviolet radiation (the "cyanogen band") which is in excess of that observed in sunlight. By covering the carbon arc with a screen of special glass it is possible to shut out the ultraviolet rays of short wave lengths and the infra-red rays of long wave lengths, which are not present in sunlight; but the intense violet "cyanogen band" will remain until an amethyst colored screen can be devised which will partly absorb this band.

Whether it is necessary to use artificial radiation having exactly the same spectral energy distribution as sunlight for therapeutic purposes remains to be determined, and is not a question for the bureau to decide. It is, however, relevant to add that the radiation emitted by the carbon arc depends on the electric current and the kind of electrodes used (white flame, blue flame, yellow flame, red flame), and that it depends but little on the kind of mounting of different manufacturers. Comparative data on the carbon and the mercury arc lamps (the formed under different conditions of current, etc.) are given in Scientific Paper 539, obtainable only from the Superintendent of Documents, Government Printing Office, Washington, D. C., price 15 cents prepaid.

Activated Ergosterol in Treatment of Rickets. By S. Karelitz in Am. J. Dis. Child., 36:1108: Dec., 1928; Abst. in J. A. M. A., 92: 6; 503: Feb. 9, 1929.

Karelitz's results agree with those reported by others. All but one of the patients showed healing following the administration of a daily dosage of 5 minims, or 0.3 cc. of vigantol or 3.33 of activated ergosterol in oil, given over a period of from three to eight weeks. A colored child aged 7 months, who had craniotabes with moderately severe rickets, was definitely improved in seven days following the administration of 6 mg. daily, and the condition healed in ten days. The other children showed healed craniotabes in from 14 to 21 days. Roentgen evidence of healing in the long bones was seen as early as twelve days, but it usually required three weeks. Patients with tentany were cured in fourteen days. Healing took place despite complicating diseases, such

as pneumonia or grip. The general disposition of the children seemed to improve after two weeks. In the mild and moderate cases of rickets, a complete filling in of the metaphyses occurred in about six weeks, but in an extreme case the condition had not completely healed in eight weeks, although each week after the third a definite and marked improvement was seen over the preceding observations. The blood calcium and phosphorus usually returned to the normal amount within about two weeks. There did not seem to be any difference in the results obtained with the German and with the native preparations of vigantol.

These Ultraviolet Rays. By E. E. Free, in Harpers Magazine, 158:341-343: February, 1929.

To buy an alleged ultraviolet lamp for less than ten dollars is probably safe enough physiologically, for in testing scores of such lamps one laboratory in New York has found none able to emit enough real ultraviolet rays to damage a mouse. And if anybody can afford to pay more than ten dollars for an ultraviolet lamp he can well afford another ten in order to ask his physician first whether he really needs one and how he ought to use it.

Physical Therapy in Dermatology. By E. William Abramowitz, M. D., New York, N. Y., Assistant Professor of Dermatology and Syphilology, New York Postgraduate Medical School and Hospital, in Clinical Med. & Surg., 36:4:225-232: April, 1929.

Roentgen Rays

MacFee, in discussing the present status of cutaneous roentgen ray therapy, gives a list of over eighty different dermatoses in which this physical agent has been found useful. It is the method of choice in such diseases as fungus infection of the scalp, localized pruritus, localized hyperdrosis, bromidrosis, and a few rare diseases of the skin. It is a boon for eczematous lesions, lichen planus, and some acne vulgaris, which fail to respond to the usual dermatologic methods. It has its indications in psoriasis, seborrheic dermatitis and acne rosacea, but should be subordinated to other remedial measures. It should be given a trial in the cocogenis sycoses for, not uncommonly, satisfactory results are obtained. Carbuncles and furunculosis respond favorably to the x-rays, if used early enough. It should not be recommended for the removal of superfluous hairs, on account of the disfiguring sequelae.

Granting that excision, caustics, curettage and surgical diathermy are also capable of curing the average case of basal-cell epithelioma, the advantage still remains with irradiation, because nervous and debilitated patients are apt to suffer from pain and mental shock with operative procedures.

Radium Therapy

Relapses in basal-cell epithelioma, following the use of x-rays or after any other method, may respond to radium therapy. When this type of neoplasm has invaded the bone or cartilage, radium is of questionable value and surgical methods (diathermy) must be resorted to. The only type of radiation available for malignant disease of the mouth is radium. As we are dealing with a dangerous neoplasm in most instances, it is considered necessary, not only to treat the lesion locally with radium, but after a short interval, to encise the irradiated area by means of diathermy, not neglecting irradiation of the lymphatics that drain the affected part.

The treatment of election in cavernous angioma is radium, because it is painless and gives the best cosmetic results.

Grenz Ray Therapy

If it is remembered that atrophy or telangiectasis can occur ten or more years after the application of x-rays it will be seen that such sequelae cannot be absolutely excluded following the "grenz" rays until a similar period of time has elapsed.

The length of time since this method of treatment has been applied to various dermatoses has been too short to establish its limitations and advantages.

Ultraviolet Radiation (Actinotherapy)

Local scorching applications of ultraviolet rays are frequently useful in alopecia areata and totalis, but are only of adjunct value to the hygienic and medicinal treatment of other types of alopecia. Acne vulgaris, rosacea and seborrheic dermatitis are only temporarily benefited. It may relieve the itching in pruritus and pruriginous dermatoses, like Duhring's disease or neurodermatitis. Some advise strong radiation in psoriasis. Goeckerman prefers tanning effects only, in conjunction with crude coal tar ointment. Pityriasis rosea, when not responding to the usual methods, will often clearup nicely after mild exposures of ultraviolet rays. Chronic eczematous patches, indolent ulcers, and occasionally a case of portwine mark may be cleared up, if treatment is persisted in long enough. X-ray ulceration may be improved by actinotherapy. Repeated blistering is necessary for portwine mark and x-ray telangiectasis, but failures are commonly reported.

Infrared Radiation

This form of treatment is recommended for a skin irritated or pigmented by the quartz lamp or sunburn; also for erysipelas, for pustular eruptions, and for drying up an acute, weeping eczema. I have also found it valuable in preventing pustulation and allaying the neuralgic pains of herpes zoster.

Surgical Diathermy (Endothermy)

Desiccation is useful in brown nevi, adenoma, sebaceum, fibroma, telangiectasia, xanthelasma, leukoplakia, karatoses, the different varieties of warts, molluscum contagiosum and chancroids. It is advocated by some for the removal of superfluous hairs, instead of electrolysis.

Coagulation is preferred in granuloma, pyogenicum, anatomic tubercle, lupus vulgaris, rhinophyma and ulcerations of radiodermatitis. . . . Malignant lesions that have failed to respond to other methods, especially radium or x-rays, are to be removed as thoroughly as possible, irrespective of the resulting scar.

Galvanotherapy

Simple Galvanic Therapy. The direct, unmedicated application of the galvanic current, with flat electrodes, to various skin lesions, is but rarely employed.

Electrolysis. The electrolytic action of the direct current is utilized in the destruction of superfluous hairs, nevi and telangiectasis. For hypertrichosis it is a harmless method, removing the hairs permanently with very little scarring. The negative electrode, carrying a fine

platinum or steel needle, should be used for destroying the hairs; the positive pole only to complete the circuit. The amount of current necessary varies from one half to two milliamperes.

The hair mole, usually also pigmented, may disappear when the hairs are destroyed by electrolysis.

Ionic Medication. From 2 to 10 ma. of current are indicated, depending on how much the patient will tolerate and the effects desired. One per cent zinc sulphate solution is used for alopecia areata, corns and callosities. Five per cent magnesium sulphate solution or zinc needles are used for warts. Oliver has obtained some good results in pruritus ani, using a one per cent solution of iodine or zinc sulphate, and also mercury oxycyanide of the same strength.

Galvanocautery. James F. Percy and others who have recently made extensive trial of the electrocautery, consider this agency as extremely valuable in cancer of the skin, breast and other structures.

Refrigeration

The liquid carbon dioxide is allowed to evaporate into a chamois bag and then molded to any desired form.

A solid carbon dioxide crayon, or the cryocautery, when applied to the skin, produces a thrombosis of the cutaneous vessels.

This is the method employed for the treatment of angiomas. The cavernous angioma, however, responds much better to radium, and it is only in the raised angiomas, and also in the portwine mark that freezing therapy finds its best field of usefulness.

The results with refrigeration therapy in portwine marks of small dimensions seem to be more gratifying than when they are treated with pressure, by means of the water cooled quartz lamp.

The flat brown nevus is best treated by freezing; but if it is also of the hairy type, the hairs must first be destroyed by electrolysis.

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